THE MARINE REVIEW

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Ship Program is Over the Shoals

Revelations of Past Few Weeks Carry a Deep Significance for America's Present and Future Maritime Success—The Meaning of Hog Island

AMERICA is rapidly attaining her stride as a shipbuilding nation. During the past few weeks an impressive array of accomplishments has been revealed which shows that the predictions even of the most optimistic are likely to fall short of the record which American shipyards are making and will make in the immediate future.

The last two of the government's big fabricating yards launched their first boats early in August, thus definitely stepping from the plant construction stage to the field of ship construction. In its broad significance for the future, probably no event which has occurred since the United States embarked on its constantly expanding shipbuilding program carries as great importance as the completion of these three fabricating yards.

July's Wonderful Launching Record

The 31 days of July were marked by launchings of 123 ships with a deadweight tonnage of 631,944. In the same month, 41 ships with a total deadweight tonnage of 235,025 were completed. Addition of two vessels delivered from Japanese yards brought the total delivered tonnage just above the quarter-million mark. The new yards are rapidly being finished. A ship has been launched 14 days after the laying of the keel. New revelations of progress come daily.

The fabricating yards at Bristol, Pa., and at Hog Island, launched their first boats almost simultaneously. The Submarine Boat Corp., Newark, N. J., the third of the original fabricating plants, had launched its first ship some weeks earlier. The Bristol and Newark plants have a total of 40 ways, with 60 ships of 9000 tons deadweight and 150 ships of 5000 tons deadweight under contract, respectively. Hog island, with 50 ways, has orders for 110 ships of 7500 tons deadweight and 70 ships of 9000 tons deadweight. Thus Hog island is closely matched in size by the two other yards combined.

Hog island, owing to its huge size and almost unlimited capacity for ship production, has naturally aroused the greatest interest. The wall of ways and forest of derricks which now tower along a section of the Delaware river where for centuries man's handiwork had never been seen, furnish the outward symbols of America's industrial force now springing to meet the barbarian's challenge to civilization.

A New Chapter in Industrial History

Development of the world's greatest shipbuilding plant carried with it concurrently the development of the largest ship producing organization. The progress of large American industrial units almost invariably is the familiar story of growth from small beginnings. Rapid as such growth has been in the case of many present-day industrial giants, it is but a snail-like pace compared with the practical completion of the Hog island yard in 11 months. The observation of one prominent visitor that Hog island and the Marne rank equally as the most important places in the world has been widely circulated but deserves repetition. The yard stands today as an assurance that America can and will meet any emergency which Germany's illegal maritime tactics may impose. It stands, too, as an assurance that the United States is taking its old rank among the maritime nations of the world—a rank which it is unlikely again to forfeit.

When the QUISTCONCK was launched in the waters of the Delaware river, carrying the distinction of being Hog island's first ship, the event was more than the mere addition of another urgently needed cargo carrier. She signified the successful completion of two big American ideas. One was the construction of the world's greatest shipbuilding plant. The other was the adoption of fabricating methods to ship construction. The success of this innovation is certain to exert a far-flung influence on shipyard methods throughout the world from now on. As commemorative of this forward step, the special insert in this issue of THE MARINE REVIEW, giving the pictorial history of Hog island, together with an account of the launching and the spirit behind the organization, will prove of special interest.

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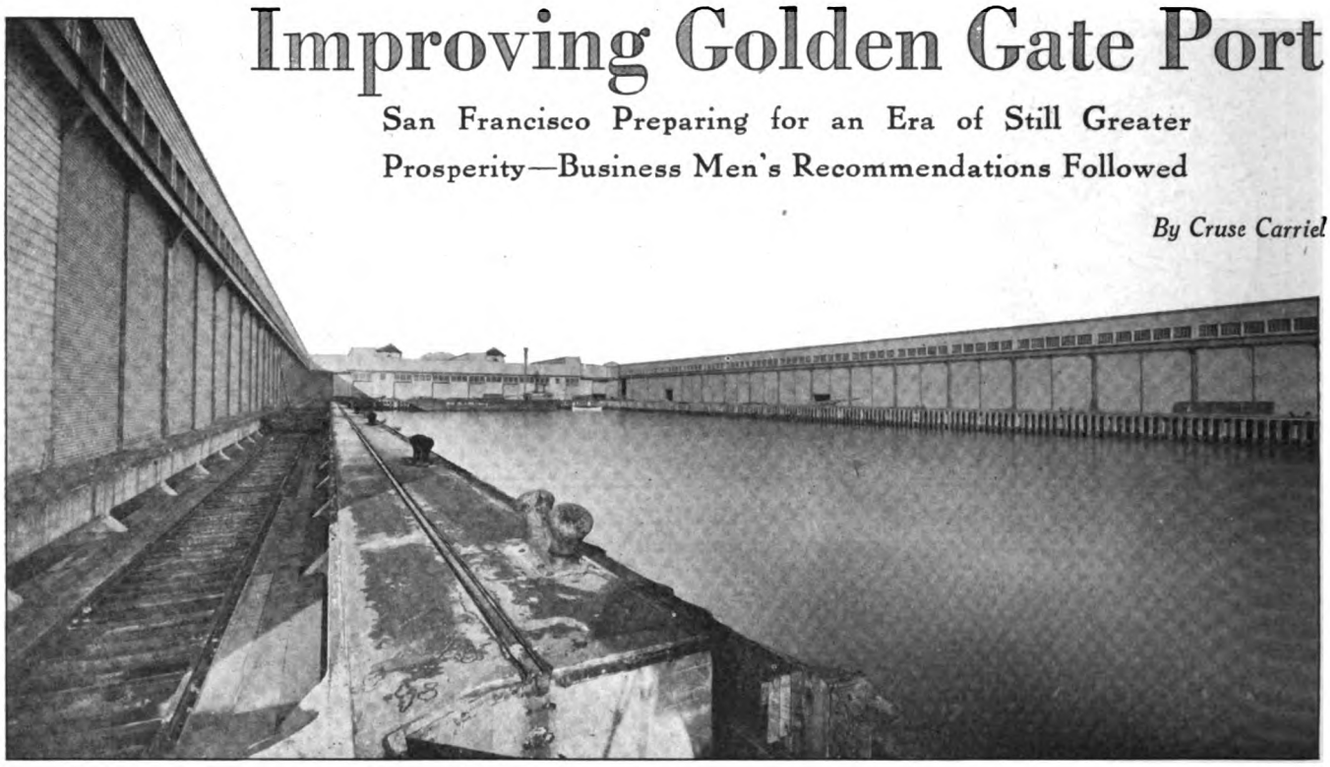
Improving Golden Gate Port

San Francisco Preparing for an Era of Still Greater Prosperity—Business Men's Recommendations Followed

By Cruse Carriel



Modern Piers at San Francisco Have Spur Tracks and Rolling Doors

SAN FRANCISCO is preparing her port for an era of greater prosperity. The stimulus of war work, the throb of industry along the Pacific coast has awakened the city once more to its opportunities, and in addition to their patrioic endeavors, the business men of the Golden Gate have found time to attack local problems with their accustomed energy, determined to keep the business of the port far in the forefront.

A special committee representing the Chamber of Commerce of San Francisco has just completed a thorough study of the port's problems, wih a view to improving its facilities and methods of handling ships and cargoes. There was a great deal to commend and a great deal to criticize. Altogether, this comprehensive survey of the situation is expected to result advantageously to the city.

Misuse of docks for storage, lack of storage facilities and bulkhead wharf space, insufficiency of cargo-handling apparatus, and the railroad terminal system are among the features analyzed and criticized by the committee. Practically all of its recommendations will be followed, judging from the attitude of city and state officials, and steps have been taken to put some of them into effect. The harbor commission has begun the reconstruction of pier I at a ost of $250,000. Two committees f shippers, warehousemen, importers, xporters and draymen have been named by the state board of harbor commissioners to make more specific recommendations as to port charges and to devise more suitable methods for the handling of cargoes.

There is plenty of wharf space on the San Francisco waterfront but use of the wharves for storage is said to cause constant congestion. Such use of the wharves, the chamber of commerce committee finds, is due in part to a lack of warehouses and the dividing of the state-owned Belt Line railroad system into sections, resulting in unreasonable charges not only against freight but in discrimination against industrial plants along the line.

Old Customs Still in Force

Vessels coming into San Francisco have certain charges assessed against them which add about 50 cents a ton more to the vessel's cost than if they went to other Pacific coast ports where the charges are put on the freight. In addition, the absorption of loading and unloading charges by the railways at San Francisco is said to be only about 50 per cent of that absorbed by the rail carriers at the ports of Washington and Oregon, due to the customs of port of the Golden Gate city. These customs came into existence in the time of the clipper ships. They are actually "unwritten law," for it is doubtful if one could have obtained a printed copy since the big fire. Now the customs are to be considered and revised. Radical differences exist in the management of the port of San Francisco, with its state-owned wharves, and the ports of Washington and Oregon, with wharf ownership in public, private and railroad hands. The port of San Francisco performs no function except supplying wharves, for which a dockage, rental, toll and wharfage charge is made. At the northern ports the stevedoring on the docks, handling, trucking, sorting, piling and checking are performed by the dock management and a charge made therefor. San Francisco has but one set of charges for all classes of freight, whereas in the northern ports charges are based on the following freight classification: Export and import, local rail shipments; export and import, local delivery; domestic and British Columbia freight.

There have been cases in San Francisco where vessels have discharged and left port and still had to pay a rental on freight left on the wharf over the movement of which the vessels' owners had no control, until the freight was finally taken away by the consignees. This was due to the system at this port under which a ship pays charges that in northern Pacific ports are placed upon the cargo. In addition to the regular stevedoring work on the vessels, independent stevedoring companies perform services on the San Francisco wharves which ordinarily are carried as a handling and loading charge at the northern ports and col-

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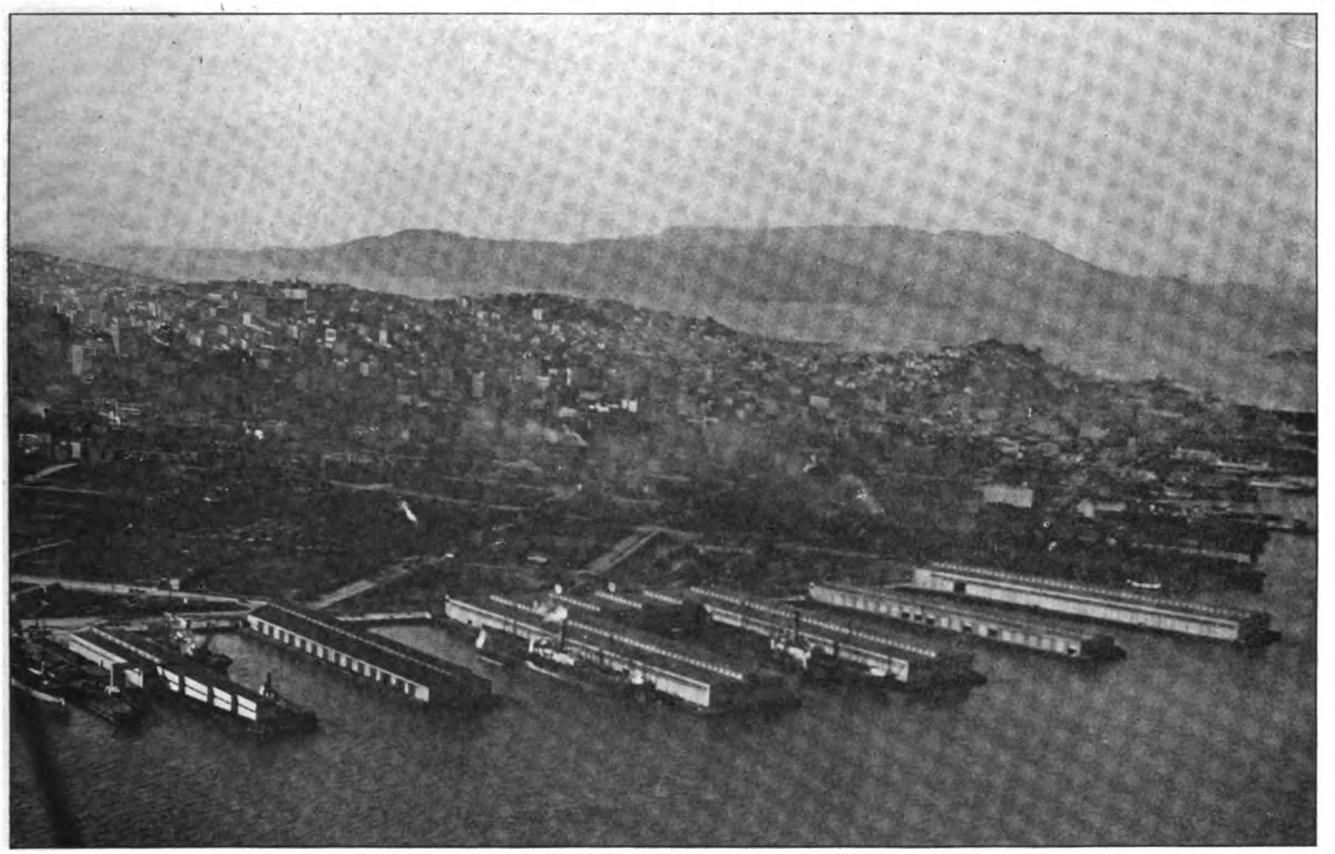

AIRPLANE VIEW OF SAN FRANCISCO DOCKS SOUTH OF MARKET ST.

DOCKS NORTH OF MARKET STREET, SHOWING THE STATE-OWNED BELT LINE RAILROAD WITH SPUR TRACKS TO WHARVES AND FREIGHT YARDS

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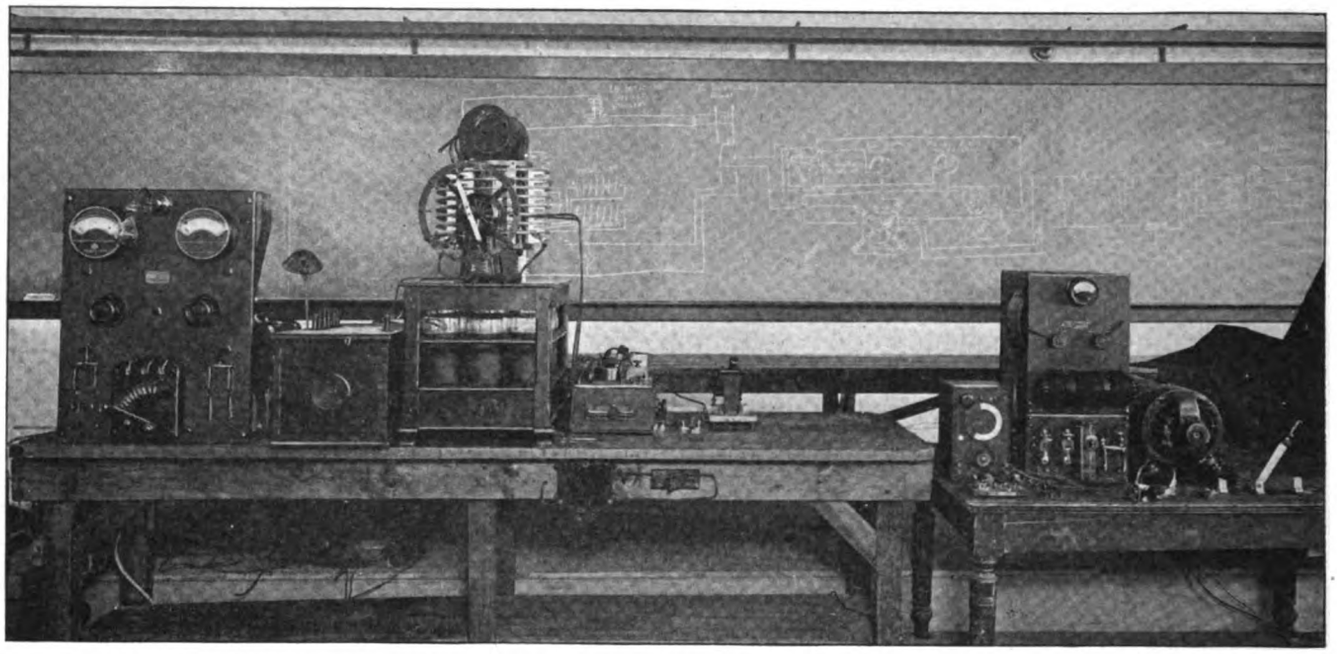
lected by the management of the wharves.

In its study of the Belt Line railroad system, the committe found that the railroad has a monopoly along the Embarcadero and attempts to operate without cars, handicapping the movement of freight to and from vessels and warehouses and adding to the congestion of freight on the wharves. The system of dividing the line into sections and charging for service on each section is said to be detrimental to the best interests of the port and led to the recommendation of a maximum charge of $2.50 per carload for switching anywhere on the line.

Stowage Space is Lacking

There is said to be a serious lack of cheap, short-time storage space near the San Francisco wharves and docks and facilities for handling and storing vegetable oils. Adequate bulkhead wharf space is noticeable by its absence.

The advantages enjoyed by shippers on the railroad-owned wharves in the northern ports in the control of freight movements has led to the consideration of the advisability of assigning wharves to the railroads at San Francisco, giving them freer control of business done by them. This would at least put the railroads on an equality with these serving the northern ports, it is suggested.



Where Wireless Operators for the Great Lakes are Trained—Some of the Radio Apparatus at the Government Y. M. C. A. Detroit Radio School

Detroit Establishes a Radio School

THE idea of having a radio school located at some central port on the Great Lakes is said to have come originally from Washington where the commissioner of navigation has long been aware of the need of such an organization. The credit for successfully organizing and successfully conducting the government Y. M. C. A. radio school at Detroit, however, is largely due to S. W. Edwards, United States radio inspector, Detroit. When the United States entered the European conflict the demand for skilled radio operators far exceeded the supply—something had to be done and the bureau of navigation did it.

The work of Mr. Edwards in starting the Detroit school under difficulties and of bringing it to its present high standard of efficiency has attracted wide attention. In addition to his regular duties at his office, Mr. Edwards has personally given all the lectures and handled a great deal of the code work. The instruction has been thorough, beginning with magnetism and ending with radio laws and regulations. Also, it has covered the construction of wireless apparatus as well as its operation and upkeep.

From the start, it has been evident that the school would be a success and that it could not help but play an important part in the development of radio communication on the Great Lakes. The students quickly caught the spirit of the work and although a large number of those who started were called into the army, or enlisted in the navy, the attendance and progress has been satisfactory. The percentage of the graduates who passed the government examination on the first trial was far above the average.

Instructors Are Competent

The course of instruction give at Detroit is the same as that given in the large school at Boston. The instruction is given by the radio inspector and his assistant, F. W. McDonald, who is a first-class operator with thorough training on the lakes. The school opened Oct. 15, 1917, with 60 students enrolled in the day class and 160 in the evening class. The Y. M. C. A. furnished a large room in the building where the automobile school is conducted, equipped with tables, chairs, buzzers, a blackboard and other necessities. The Y. M. C. A. charged a small fee to put the new department on a self-supporting basis.

The work of the school has been greatly furthered by the co-operation of radio manufacturers who have furnished apparatus and diagrams, and have endeavored by their help to make the school a success. Cutting & Washington, Inc., Boston, loaned two complete ½-kilowatt panel sets of their modern 500-cycle type; the Marconi Co. furnished a 2-kilowatt, 240-cycle nonsynchronous set and the Telca Laboratories supplied the necessary laboratory and experimental apparatus.

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How Concrete Ship Was Developed

First Reinforced Concrete Construction Used in Rowboat in 1849—Experience Has Shown Certain Types to be Best

By Frank C. Heard

OWING to the fact that there has been apparently a radical distinction between ship designing and general construction work with reinforced concrete, it is strange that the first reinforced concrete work was performed in the construction of a concrete boat. A row boat was built of this material by M. Lambot, Carces, France, in 1849, and was exhibited at the world's fair in Paris in 1855. Although records up to the present are lacking, the boat was apparently in excellent condition as late as 1903. Between the time of construction of this craft and 1900 but little work along these lines was performed. In the later year a gravel barge 50 feet long, 13 feet wide and 3 feet deep was built on the River Lozere.

The construction of concrete barges and scows was started in Italy in 1899 by Carlo Gabellini, Rome. He contracted and delivered in 1905 a 150-ton barge for the city of Civita Vecchia. This was followed by the delivery of a small boat to the Italian navy for use in the vicinity of Spezia. Before the government contract could be completed the boat was put to the test of being driven into an immense piling and afterwards rammed by a steel tug. Gabellini had constructed about 80 concrete vessels up to 1912.

Construction Successful in 1887

The acceptability of concrete for barges as early as 1887 was noted in the successful construction of them by the Fabrieck van Cement-Ijzer Werken. These were of 11-ton capacity but were followed later by larger craft of 55-ton capacity which were reported practically unsinkable, being of a cellular construction formed by longitudinal and transverse bulkheads or partitions.

Germany came to the fore in 1909 with a concrete freighter of 220-ton capacity. A larger portion of the hull had parallel sides so shaped that the lines were fairly good and the water resistance was decreased below that of the rectangular barge. The watertight bulkheads were also incorporated in this vessel. It has been reported that since the outbreak of the war numerous concrete barges and some concrete ships have been built in Germany.

The Yorkshire-Hennebique Contracting Co., Ltd., Leeds, Eng., built for maintenance work on the Manchester ship canal in 1912 a reinforced concrete scow in accordance with the requirements of the canal company's engineers. This scow was of approximately 224-ton capacity, drawing 6 feet 6 inches when loaded, general dimensions being 100 x 28 x 8½ feet. The hull consisted of several watertight compartments so designed that if the exterior shell was destroyed the body of the hull would remain afloat. One compartment contained a boiler plant supported on a 4-inch floor carried on beams. Other equipment consisted of centrifugal pumps, steam winches and engines. The general construction was light, the outer skin of the hull being three inches thick. The scow has been in almost constant service since construction, with small expense for repairs.

Concrete barge construction was introduced on this side of the Atlantic in 1910 in the building of PIONEER, of 200-ton capacity on the Welland canal. This barge was 80 feet in length and used for maintenance purposes. Eight compartments were built in the hull, being divided by longitudinal and cross bulkheads, double hatchways at the stern and openings through the cross bulkheads giving access to all parts. Although this barge has been in constant service, it is still in excellent condition. She has been loaded at times with 10-ton carloads of rubble stone, dumped from a height of 12 to 15 feet directly upon the deck.

Concrete Barges On Panama Canal

In 1910 three concrete barges, 64 feet long, 24 feet beam, 5 feet 8 inches deep, were built on the Panama canal to carry dredging pumps and landing stages, consisting of reinforced concrete pontoons were built at Panama in 1913 and 1916 for use of barges up to 65 feet in length, the pontoons being 120 feet long, 28 feet wide and 8 feet deep.

A system of construction first used in 1909 was developed by Oscar F. Lackey, when harbor engineer of Baltimore, in building a landing stage for small boats. In 1912 this idea was applied to building a 500-ton concrete scow for the Arundel Sand & Gravel Co., Baltimore, which has been in daily use in handling gravel, and is perfectly watertight and has withstood the roughest kind of use, requiring no pumping out. This barge is 113 feet long, 29 feet beam and has depth of 10 feet 6 inches. The bulkhead system was incorporated consisting of five cross bulkheads and four longitudinal ones, dividing it into 20 watertight compartments. The shell and deck are supported by a series of vertical and horizontal beams, the slabs varying from three inches to five inches in thickness, reinforced with plain bars running in both directions.

Some undesirable features were developed in the full rounded sides and ends when operating under full load in a high sea or strong wind and in berthing. For this reason a design more along the lines of an ordinary wood scow was utilized in two other scows built in 1913 and 1915.

Progress In England

An English paper reports orders on hand for the French government for several concrete barges. Several English firms have taken up the construction of motor driven concrete barges and more recently a concrete shipbuilding company has arranged for a plant at Dundee, Scotland. A London firm of naval architects and engineers, James Pollock & Sons Co., has drawn plans for a fleet of small reinforced concrete coasting vessels, the first to be built having a length of 92 feet, beam 19 feet, and depth 10 feet, and plans are being drawn for larger vessels of from 500 to 1500-ton cargo capacity.

A recent statement of the first lord of the admiralty that ferro concrete barges up to 1000 tons were being built in Great Britain confirms the report received from an American engineer now in England that he has recently designed a number of barges and sea-going vessels and is at present interested in the building of 10 such barges of this capacity.

The first in Spain to engage in the construction of concrete ships is a corporation known as Works and

From a paper presented at a meeting of the Brooklyn Engineers' club, held recently. The author, F. C. Heard, is associated with the Portland Cement association, New York.

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Pavements, Barcelona. Its first boat was about 110 feet long, 23 feet beam and 11½ feet depth, and, in addition to having a 120 horsepower diesel engine it is fitted with sails. This firm plans to construct during 1918 a gross tonnage of 40,000 in standard ships of 300, 500 and 1000 tons each, while ground has been acquired to permit the construction of 30 boats at a time, some of which are planned to be of 6000 tons capacity. A dense, impermeable mixture, consisting of one part of cement to two and one-half parts of graded sand and gravel of three sizes is used, which permits constructing the thinnest possible section to reduce weight and obtain speed. The concrete must develop a compressible strength of 3800 pounds per square inch in 90 days, and a working strength of 1100 pounds per square inch has been adopted.

Construction by the Spanish firm is by no means initial along these lines for Norwegian and Danish firms have already built and launched several concrete ships and self-propelled lighters of 200-ton capacity and now have larger craft under construction.

The Fougner Steelconcrete Shipbuilding Co., established a plant at Morss, Norway, in 1916, they being one of the first in the field following successful experiments made by Nicoli K. Fougner with a 50-ton concrete lighter at Manila in 1914. The company has built some 20 reinforced concrete lighters and two boats.

The company has established an American branch in New York and has obtained a contract from the shipping board for several 3500-ton ships, contingent upon the success of the first. It also has under construction several 600-ton oil carrying barges.

First Large Cargo Vessel

The concrete vessel to which probably the greatest interest is attached at present is the FAITH, the 336-foot, single-screw cargo ship of about 5000 tons capacity, built at Redwood City, near San Francisco, and launched March 14.

A joint committee of the American Concrete institute and the Portland Cement association has been investigating the subject of concrete ships in a preliminary way. It recently prepared a report covering points to be considered in designing such vessels and submitted a tentative design for a 2000-ton seagoing barge of the following dimensions: length, 227 feet 6 inches; length between perpendiculars, 220 feet; beam, 42 feet; depth, 23 feet; loaded draft, 18 feet. The displacement is estimated to be 3675 tons on an 18-foot draft. The vessel is divided into five compartments by transverse bulkheads, the three center compartments being for cargo and the other two for tank and ballast. In designing, the standard followed was a steel ship designed according to Lloyd's rules, and practically equivalent strength provided in reinforced concrete. A concrete of 1:1:2 mixture with carefully selected sand and gravel, about one-half inch in size, was decided upon and considered to develop an ultimate crushing strength of at least 3000 pounds per square inch, allowing a maximum stress in concrete of 1000 pounds per square inch.

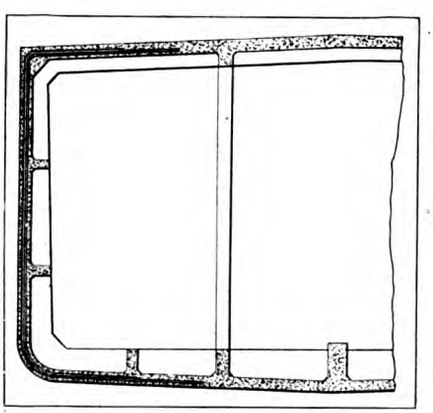
The spacing of the frames is four feet and the thickness of shell four inches on the sides and five inches on the bottom. Two lines of reinforcement are provided. The deck is three inches between hatches and along the lines of the hatches and five inches thick outside these lines.

An estimate of material required gave the following: concrete, 731 cubic yards; steel, 482,000 pounds; flooring for hold, 30,000 feet, board measure; oak timber (fender rail, etc.), 15,000 feet, board measure.

The total weight of the ship was estimated to be 1647 tons and the carrying capacity 2028 tons for an 18-foot draft. The cost of the hull per ton dead weight was estimated at $63, the best available figures on the cost of a steel hull of the same character was $90 to $120 per ton and up; cost of wooden hull, $70 to $100.

Improved Design for Concrete Ships

TO perfect a concrete vessel of comparatively thin section and at the same time assure stability while laboring in a heavy seaway is one of the many problems that confront builders of concrete vessels. Alan Macdonald of the San Francisco Shipbuilding Co., San Francisco, builder of the FAITH, recently obtained a patent on concrete ship construction in which the reinforcing bars are arranged with the special purpose of bearing the shearing strains to which the sides and bilges of the vessel are subjected.

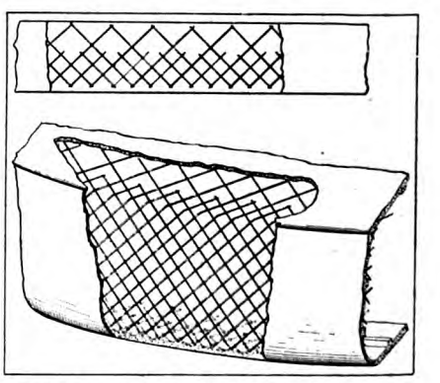


MIDSHIP SECTION OF A CONCRETE VESSEL

The illustration at the right is a section of a concrete ship with the reinforcing bars arranged according to the inventor's plans. As shown, they run diagonally from points inside the rail and they are bent at the gunwale and run down the sides of the vessel and under the bilges. The bars are arranged alternately as regards length. The object of this is to avoid termination points along the same line. This is graphically illustrated at the upper right. At the left is shown a midship section of a concrete vessel constructed according to the inventor's plans.

The principle utilized is not a new one by any means because builders of wooden vessels often insure ships against undue hogging and sagging by placing a steel cord plate around the shear of the vessel from which double diagonal strapping runs down the sides to the bilges. This reinforcing is placed between the frames and planking and is described on page 419, of the current issue of THE MARINE REVIEW.

This principle applied to concrete ship construction is designed to aid materially in lessening the strain to which the vessel is subjected. A concrete ship possesses but little flexibility and for this reason it is necessary to reinforce the hull as thoroughly as possible. Otherwise the straining of the hull would cause abrasive action in the structure which together with the moisture from seepage would start premature disintegration.



HOW THE REINFORCING BARS ARE ARRANGED

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H. F. Alexander

He Began His Career as a Longshoreman and Today is President of a $15,000,000 Corporation

By Robert C. Hill

AS a young man, he had ambition, confidence and the will to succeed. Today—12 years later—Herbert F. Alexander still has the same attributes, but strengthened by a record of accomplishment unusual at his age. He is one of the best-known shipping operators in the United States. As president of the Pacific Steamship Co., he is known as the colossus of the shipping game on the west coast.

When he was 26, Mr. Alexander induced a number of his wealthy fellow citizens of Tacoma, Wash., to invest sufficient capital to enable him to purchase two steamships on the Atlantic. With these he inaugurated a new freight and passenger freight line operating between Tacoma, Seattle and San Francisco.

Tackling a Big Job

The audacity of the undertaking caused the wiseacres to gasp. Others had attempted to compete with the Pacific Coast Steamship Co., the powerful coastwise line, but not for long. It was freely predicted that the young man would learn his lesson in six months. They really felt sorry for him, for they all liked him, but there was no chance to break in on the old established company, they claimed. "Bert" Alexander was a nice young man, they admitted, but it was really too bad for him to attempt anything so visionary.

On Nov. 1, 1916, this same young man, then 37 years old and known throughout the country as one of the most clever and astute steamship operators in the United States, was elected president of the consolidation of his own line—the Admiral fleet—and the Pacific Coast Steamship Co., the powerful competitor, under the name of the Pacific Steamship Co.

When the merger took effect, it was the smaller company which dominated, through Herbert F. Alexander, the negotiations. The younger corporation asserted itself although it owned the smaller fleet. Mr. Alexander succeeded in pooling his assets on a 50-50 basis and in addition he was elected executive of the combined company.

* * *

When 11 years of age, Herbert F. Alexander arrived in Tacoma with his parents. The family was then wealthy but three years later, the fortune was swept away and the father died a short time afterward. Thus at 14, the boy went to work. He chose Tacoma's waterfront and as a longshoreman, started to work at hard day labor. Since then his meteoric career, which has finally landed him as president of a $15,000,000 corporation, may be briefly summed up as follows:

HERBERT F. ALEXANDER

At 17—Entered the employ of Carlill & Co., predecessors of Dodwell & Co., prominent factors in the Oriental trade out of Puget sound.

At 20—Obtained a position with the Commercial Dock Co., Tacoma. Raised sufficient capital to buy a part interest in the company, becoming its manager.

At 21—Was elected president of the Commercial Dock Co.

At 26—Organized the Alaska-Pacific Steamship Co., purchased the steamships BUCKMAN and WATSON in New York and inaugurated freight and passenger service between Puget sound and San Francisco; elected president of the steamship company.

At 27—Determined to enter the Alaska trade; obtained control of the Alaska Coast Co., owning the steamships JEANIE, PORTLAND and BERTHA; elected president also of this company.

At 32—Brought into existence the Pacific-Alaska Navigation Co., which took over the Alaska-Pacific Steamship and Alaska Coast companies; christened it the Admiral line and purchased additional steamers; elected president of the enlarged corporation.

At 36—Added three more steamships, improved the service by chartering other vessels as needed, notably the fast passenger liners HARVARD and YALE,

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operating between San Francisco and southern California.

At 37—Accomplished the great feat of his ambitious career by bringing about the organization of the Pacific Steamship Co.; elected director of the Seattle Construction & Drydock Co., and also director of the First National bank, Seattle.

Like all his other ventures, his first—the Commercial Dock Co., at Tacoma—has prospered and enlarged and he still remains its president.

Under the consolidation plan, the Pacific Steamship Co. has chartered on a long time basis the fleets of the two companies forming it. The combination consists of the larger company and the smaller company plus Alexander. While he is not officially listed as one of the "properties," the young executive was one of the best assets offered by the Pacific-Alaska Navigation Co.

Handling a Big Fleet

With the enlarged fleet, working under one management, Mr. Alexander in 21 months has been able to realize the objects sought in the merger. These include improved service, elimination of overhead expense, and duplication of service and naturally better returns on the capital invested. The plan has had but a brief trial but present indications are that Mr. Alexander's idea will be fully justified by results.

Having started the enlarged fleet under competent management, Mr. Alexander has had little time to devote to the Pacific Steamship Co. during the past year. He has voluntarily enlisted with the nation's big men who are now giving freely of their time, experience and effort to the government. He has spent many months at the national capital and elsewhere in the east where he has rendered spendid service to the national government. His experience and advice have been found of great assistance in solving some of the larger shipping problems confronting official Washington.

The new colossus of Pacific shipping is a big man—big mentally, big physically, big in creative genius and accomplishment. He has the face of a college boy and the broad, square shoulders of an athlete. He is big-fisted, red blooded, straight limbed. He has unbounded energy, an amazing capacity for work, a creative brain and above all that subtle faculty called vision.

"I can't do anything but I can pick men who can," he has often said modestly.

Choosing His Assistants

This perhaps explains in part the secret of his success. He has a wonderful capacity for picking out high-class men of ability to handle his companies. No man is too expensive if he can deliver the goods. And besides this, Alexander is an ideal man as an employer. He exacts results but his men will go the limit for him. Nor is his ability limited to picking capable subordinates. He has had equal success in inducing men of wealth to invest. He inspires them with confidence and his achievements have confirmed their good judgment. He selects his directors with the same care he does a traffic manager and the result is the same absolute loyalty to the company and to its guiding genius. Among the men of wealth who are interested in Alexander's companies are: A. Barton Hepburn, chairman of the board of the Chase National bank, New York; T. B. Wilcox, wealthy flour manufacturer and banker, Portland, Oreg.; Chester Thorne, chairman of the board of the National Bank of Tacoma; D. C. Jackling, millionaire mining operator; William Jones, wealthy capitalist, Tacoma; S. A. Perkins, Tacoma publisher, and many others. His stockholders also include a number of Tacoma people of moderate wealth who invested when Alexander was beginning his upward climb. It looked like a long chance in those days but they had confidence in Alexander and he has made good.

In pooling their interests the two companies turned over the following steamships. The figures indicate gross tonnage:

Pacific Coast Steamship Co.—AURELIA, 743; CITY OF SEATTLE, 1957; CITY OF TOPEKA, 1057; CONGRESS, 8145; CURACAO, 1477; GOVERNOR, 5475; HOMER, 501; PRESIDENT, 5453; QUEEN, 2728; RAVALLI, 998; SENATOR, 2432; SPOKANE, 2277; UMATILLA, 3125; total, 13 vessels of 36,368 gross tonnage.

Pacific-Alaska Navigation Co.—ADMIRAL DEWEY, 2104; ADMIRAL EVANS, 2393; ADMIRAL FARRAGUT, 2104; ADMIRAL GOODRICH, 1419; ADMIRAL SCHLEY, 2104; ADMIRAL SEBREE, 2446; ADMIRAL WATSON, 2009; HARVARD, 5054; YALE, 2731; total, nine vessels of 23,364 gross tonnage.

Enters Oriental Trade

When the merger became effective, the vessels of the two fleets operated from Nome, Alaska, to San Diego, Cal. Today, the Pacific Steamship Co. not only gives service on the various routes between the Norton sound port and the Mexican border but it has expanded into the Oriental trade and also to the West coast. The company is operating the UMATILLA and SENATOR between Seattle, Hongkong and Singapore while the ADMIRAL GOODRICH is running between Puget sound and Chilean ports. Plans are in the making for extending the company's foreign trade routes.

Since the formation of the Pacific Steamship Co., the steamship CONGRESS, which was badly damaged by fire, was sold to the Pacific Mail Co. Additions have been made by the purchase of the steamship GRACE DOLLAR, renamed ADMIRAL WAINWRIGHT, and NORTHLAND, renamed ADMIRAL NICHOLSON.

One of Mr. Alexander's recent innovations is the formation of a towing and lighterage service reaching to all Puget sound ports so that freight can be brought to Seattle and handled without time being lost by the larger vessels of the fleet.

Part of the Pacific Steamship Co.'s fleet has been commandeered by the government and it is an open secret that Uncle Sam will profit largely by the foresight of Alexander and his associates in entering the Oriental trade at a time when big profits are to be made. Likewise, the government has to some extent upset the Puget sound-California service by taking over the fast passenger steamships PRESIDENT and GOVERNOR.

"Once in every man's life there comes the great adventure—the Great Northern was mine," said James J. Hill, the railroad king. So at 38, when a majority of future captains of industry are still unknown, can Herbert F. Alexander say: "I have had my great adventure—it is the Pacific Steamship Co." But with his natural ability and far-seeing vision, Mr. Alexander is likely to have other adventures, equally noteworthy, before he goes "over the top" in his business career.

Late Marine Patents

Copies of any of the following patents can be obtained by sending 15 cents in stamps to Siggers & Siggers, patent attorneys, National Union Insurance building, Washington, by mentioning THE MARINE REVIEW.

1249323.—Means for protecting vessels from projectiles, Antonio Campanaro, Trenton, N. J.

1249422.—Hole-closing device for ships. Cheli Kook, Akron, O. Assignor of one-eighth to Stanley Besser, Warren, O.

1249470.—Torpedo-guard. Pleasant R. Overlin, Evansville, Ind.

1249486.—Sunken ship-locating device. Lewis Polachek, Akron, O.

1249530.—Electromagnetic ship's log. Chas. G. Smith, Cambridge, Mass., and Joseph Slepian, Boston.

1249589.—Guard. William E. Beydler, Beaverton, Oreg.

1249633.—Life boat. Joseph Jelercic, Willard, Wis.

1249645.—Life boat. Andreas P. Lundin, Bayside, N. Y.

1249690.—Metal barge. John L. Taylor, Oakmont, Pa.

1249829.—Safety navigable marine parachute. John J. Reynolds, Rantoul, Ill.

1249836.—Ship protector. Joseph Santore, Osceola Mills, Pa.

1249844.—Torpedo-guard for vessels. Charles Sokolowski, Elizabeth, N. J.

1249887.—Life saving raft. John Benyak, Glassport, Pa.

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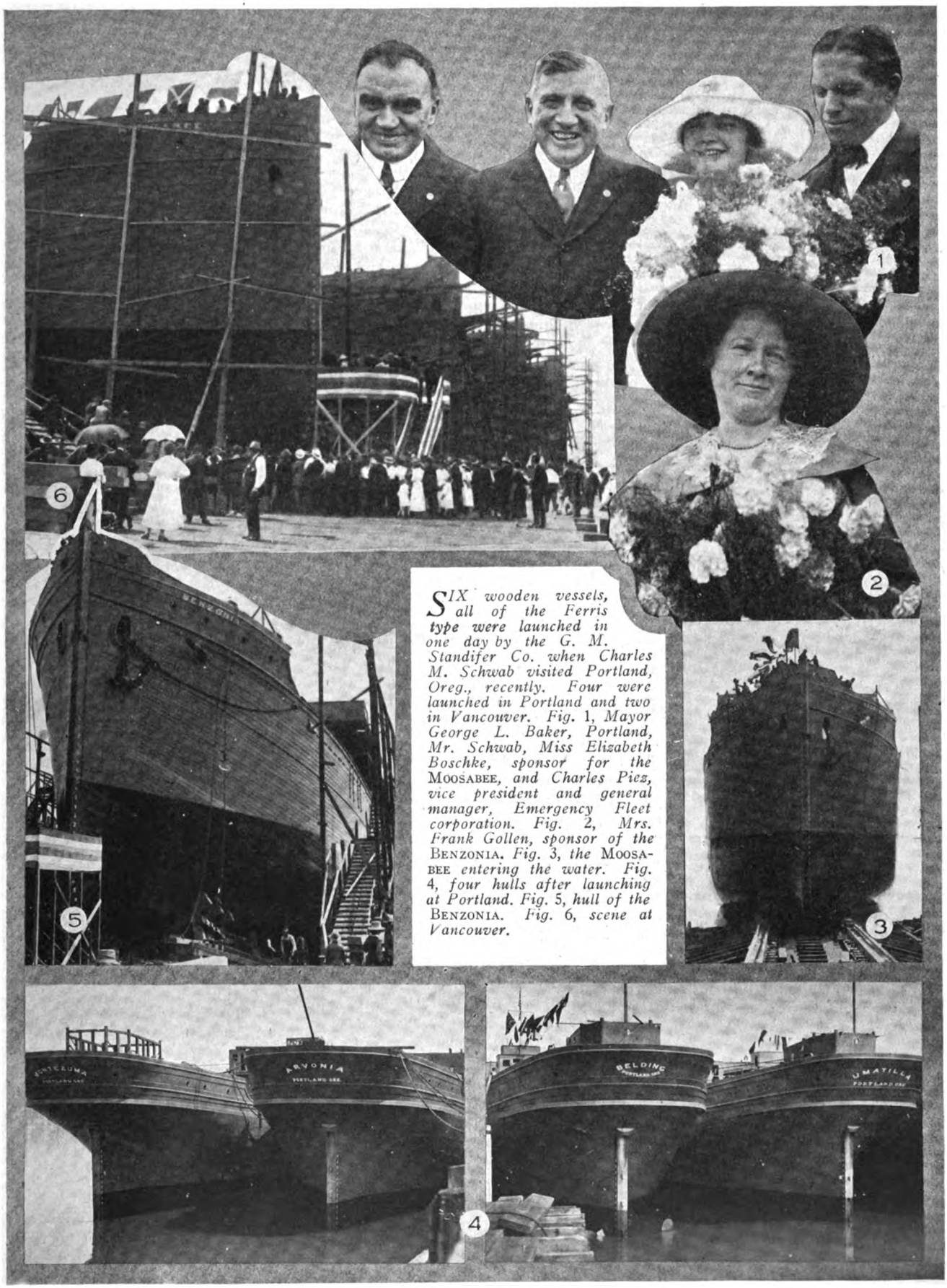
With Schwab on Visit to Portland



SIX wooden vessels, all of the Ferris type were launched in one day by the G. M. Standifer Co. when Charles M. Schwab visited Portland, Oreg., recently. Four were launched in Portland and two in Vancouver. Fig. 1, Mayor George L. Baker, Portland, Mr. Schwab, Miss Elizabeth Boschke, sponsor for the MOOSABEE, *and Charles Piez, vice president and general manager, Emergency Fleet corporation. Fig. 2, Mrs. Frank Gollen, sponsor of the* BENZONIA. *Fig. 3, the* MOOSABEE *entering the water. Fig. 4, four hulls after launching at Portland. Fig. 5, hull of the* BENZONIA. *Fig. 6, scene at Vancouver.*

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Elimination of Ship Smoke

Engineers Agree That It Can Be Done But No Two Would Use Same Method

AVOIDANCE of smoke would decrease the radius of visibility of ocean carriers by many miles and greatly reduce their liability to attack by the German submarine, which although considerably less effective than it was earlier in the war, nevertheless remains something of a menace. The maritime world, of course, is interested in any and all discussions of ways and means of defeating the undersea boats and the spring meeting of the American Society of Mechanical Engineers at Worcester, Mass., June 4-7, provided such a discussion.

The question asked was: How Can Soft Coal be Burned Without Smoke in Marine Boilers? Five written and two oral discussions were contributed, only one of which doubted the feasibility of burning soft coal in marine boilers with a complete elimination of smoke. But as to methods to be pursued, the "doctors" could not agree.

Albert A. Cary, consulting engineer, 95 Liberty street, New York, urged that smoke elimination was possible through complete combustion in the furnaces and combustion chambers. He admitted, though, that in the average types of marine boilers, with their present form of attached furnaces this was well-nigh impossible to secure without sacrificing efficiency. At the same time he held that it was possible to make rational changes in the steam-generating equipments for new ships that will accomplish the desired results. He would work along the lines of the latest successful developments in land practice. This would involve some four or five feet more of head room in which to place the boilers and he would substitute mechanical for hand stoking in the boiler room.

Other Methods Suggested

Osborn Monnett, American Radiator Co., Chicago, advanced the underfeed principle as his solution of the problem. M. C. M .Hatch, Locomotive Pulverized Fuel Co., New York, expressed his belief in pulverized coal as the best means to the desired ends. Coal in pulverized form, he stated, induces the desirable intimate mixture of gases and air very early in the process of combustion. The earlier that this mixture occurs the smaller the volume of excess air necessary to complete combustion and hold down furnace temperatures to workable limits, the greater is the amount of coal that can be fired without smoke, he claimed. Henry Kreisinger, bureau of mines, Pittsburgh, would do away with hand-fired furnaces and install either mechanical stokers or pulverized coal furnaces.

It was the opinion of H. B. Oatley, chief engineer Locomotive Superheater Co., New York, that at or above a normal rate of operation of the marine steam-generating plant a complete suppression of smoke was extremely difficult if not impossible, although he could see that with some changes in boilers, furnaces and equipment, which were being introduced into new construction, that the amount of smoke could be greatly reduced.

Improvements in combustion in the power plants of boats now afloat were out of the question because of the time and expense involved in the changes. More economical use of steam, he believed would mean a reduction in the amount of smoke. Haylett O'Neil, Larchmont, N. Y., spoke in favor of pulverized coal and J. S. Schumaker, S. D. Warren & Co., Cumberland Mills, Me., testified as to the merits of the air above fire method as a means of eliminating smoke from soft coal.

American Boys Make Excellent Seamen

WHILE the Pacific coast is making rapid headway in the production of steel, wood and concrete vessels for the rehabilitation of the merchant marine, it is also active in the re-establishment of our position on the seas of a half century ago when native-born Americans manned vessels in every port throughout the seven seas. Three sailing craft out of San Francisco are now manned by entire crews of green hands, but every one of them is an American. It is true that the vessels are slightly overcrewed, but latest reports are that the lads are taking so naturally to the new life that the masters are satisfied.

The first vessel to leave a Pacific port with a full crew of green hands was the 900-ton schooner INCA. She carried seven landsmen. Then followed the full-rigged ship MONONGAHELA, manned completely by a crew of 32 green hands, experienced officers, cooks and four boatswains. The MONONGAHELA is a vessel of 2346 tons, taken over by the United States from the Germans when war was declared. With only a short training on San Francisco bay before sailing, Capt. R. P. Rasmussen sent back word by the pilot that never had he made sail so quickly on any ship he had commanded in his experience.

Our Boys Have the Punch

The next vessel to leave was the THRASHER, a 462-ton old whaler, long familiar on the San Francisco waterfront. With the coming of the war, and the ensuing renovation of every craft that would float, the THRASHER was rigged as a barkentine and left recently with a crew of eight recruits. Capt. George Townsend and the two mates were the only experienced seamen aboard. Captain Townsend has been in service as a seaman, officer and master for more than 45 years. He knows a sailor when he sees one. After a short training before the vessel left port, he said:

"When I get back to the United States this will be a regular crew. These boys will make the best sailors in the world. They go at their work with a snap and willingness which tells me that we have nothing to fear in the matter of making first-class sailors in the future."

Heave Away for Rio

In Rio Grande, I'll take my stand,
Heave away for Rio.
Oh, Rio Grande, a happy, fair land,
We're bound for the Rio Grande.
Heave away for Rio,
Heave away for Rio,
So fare you well my bonny brown maid,
We're bound to Rio Grande.

The Dominion Shipbuilding Co., Ltd., has been incorporated at Toronto, Ont., by J. M. Bullen, Norman S. Robertson and others of Toronto. The company was capitalized at $3,000,000.

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In the Traffic Manager's Office

A Review of the Month on Coasts and Lakes—Useful Pointers for the Men Who Get the Business

Canadian Harbors Being Improved

HARBOR conditions and improvements in Canada are discussed in a report made by the British Dominions royal commission which says:

The entrance to Montreal from Murray bay is 191 nautical miles, over which the minimum width of channel is 450 feet on the straight parts, increasing to from 500 feet to 750 feet on the bends. The maximum depth at piers and wharves is 35 feet at ordinary low water, and the quayage for vessels of 30 feet draft and over is nearly five miles in length out of a total quayage in the port of over eight miles. The tides of the St. Lawrence river gradually diminish and are lost in Lake St. Peter, midway between Quebec and Montreal, so that there are no tidal changes at the latter port.

The approach to Quebec is like that to Montreal for a distance of 790 nautical miles from Cape Race, practically unrestricted as to width and depth. The first bar at the Traverse is about 60 miles below the harbor, where there is a dredged channel 1000 feet wide and 43 feet deep at neap tides. The range of tide at the Traverse and at Quebec is practically the same. The existing dry dock at Levis is 600 feet long, 62 feet wide and 20½ feet deep over the sill at neap tides, but a new dry dock now under construction will be 1150 feet long, 120 feet wide and 34 feet deep over all.

At St. John, New Brunswick, the entrance is 600 feet wide, with a minimum depth of 53 feet 6 inches at low water of neap tides. The quayage is more than 2¼ miles in length, of which 3600 lineal feet has a depth of 32 feet at low water of spring tides.

The entrance to Vancouver Harbor is over three miles wide and of great depth, while the channel through the Narrows is 450 feet wide, with a least depth of 43 feet at low water. The harbor is nearly a mile wide, with deep water. The entrance channel is being widened to 1200 feet, with a least depth of 43 feet at high water, and the depth at the quays can be increased to 40 feet at low water, but no estimates of cost are available.

At Prince Rupert the northern entrance from Chatham sound is 1½ miles wide, with a minimum depth of 98 feet, and the southern entrance is a mile wide with depths of 134 feet and over. The approach channel has a minimum depth of 74 feet at neap tides over a width of 1500 feet. A graving dock 600 feet long, 100 feet wide, and 28 feet deep on sill has recently been completed. A depth of 40 feet at low water could be readily obtained at the wharves by building outwards to the extent of from 10 feet to 20 feet, but no estimate of cost has been prepared.

The approach to the harbor at Victoria through the Straits of San Juan de Fuca is 1800 feet wide at the narrowest part with a minimum depth of 51 feet at high water. In the inner harbor and approach the least width is 300 feet and the minimum depth 26 feet at high water. The total length of quayage is over 2¼ miles, of which one berth 600 feet long and two berths 450 feet long in the outer harbor have depths of 30 feet at lowest tides. The channel to the outer harbor and the berths in that harbor can be deepened to 40 feet at lowest tides, but no estimate of cost has been made.

Plans New Steamship Lines

Establishment of new steamship lines which will girdle the globe and still further increases in the huge fleet it is now operating in the transpacific trade, especially to Seattle, are among the important plans of the Ocean Transport Co., Ltd., Kobe, Japan, according to Capt. H. Makita, manager of the foreign trade department of the company, who arrived in Seattle from the Far East recently.

"I expect to spend six months on the Pacific coast making a study of trade conditions," said Captain Makita. "We have important plans under consideration for new lines and extensions of service which will ultimately carry the flag of our company to every port in the world.

"Among the services planned are lines to the east and west coasts of South America, to New York, to Galveston, New Orleans and the West Indies. We are building 60,000 tons of shipping in Japan and now have 30,000 tons under charter. My mission on the Pacific coast and my tour of the world has for its object the consideration of trade routes for the new vessels and those we have under charter. Our company is now operating vessels of large size between the Orient and Seattle, the Orient and San Francisco, to Australia, the Dutch East Indies and the Straits Settlements.

"I expect to make a general study of trade conditions, and after spending considerable time on the Pacific coast will go to Chicago, New York, the gulf ports and the east coast of South America. We now have more than 30 vessels in the transpacific trade, but expect to make still further increases in the service. Larger carriers will be placed on the Seattle-Oriental route, which is now the most important served by our company."

Captain Makita said that Drew Chidester, vice president of the Trans-Oceanic Co., agent for the Ocean Transport Co., Ltd., on the Pacific coast, recently made a tour of ports on the west coast of South America studying trade conditions and that he would confine his atention to the east coast of South America during his tour of the world's big shipping centers.

"Material seems to be the big problem in the shipbuilding industry in the Far East," said Captain Makita. "If we could get the steel we would be turning out vessels much more rapidly than at the present time but Japanese shipbuilders look for an improvement in conditions. At present we are getting all of our steel from America."

Captain Makita has crossed the Pacific 10 times and has made two trips completely around the world.

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He is a master mariner of wide experience and has made an extensive study of shipbuilding.

Reaches Trade Agreement

Large increase in steamer service between New Orleans and Mexican ports is expected as a result of the trade agreement reached in July between the United States and Mexican governments. Licenses are now authorized for the export to Mexico of 1,500,000 bushels of corn between Aug. 1 and November, while coke, if drawn from certain communities, will be licensed freely. Ammonia for ice making and for the refrigeration of foodstuffs is to be licensed, but is banned for beer brewing, which rule also applies to all the Central and South American countries.

Agricultural and mining machinery will be allowed to pass, as also, in general will articles of steel and iron manufacture, except such as are in great demand in the United States. Cyanide, dynamite caps and fuses are to be exported to Mexico to aid as far as possible the production of gold, silver, copper, iron and zinc. Powder for mining purposes also may be exported. Mexico is entitled to receive 2000 tons of common soap from Uncle Sam. Copper and zinc in manufactured forms may be shipped out, but ferromanganese is banned.

Railway equipment may be sent to a certain extent, but the Mexican government must be informed of its character and to whom it is shipped. Canned herring and sardines, butter, cocoa, condensed milk, corn, cornmeal, corn flour, candy, including chocolate; barreled beef, dried fruits, lard, mutton, oil, oats, pork, pork products, oleomargarine, oil, peas, if not for seed, and tea, may be sent to Mexico under license. The reciprocal part of this agreement is that commodities not needed for immediate consumption in Mexico may be imported freely into the United States.

To Build Large Pier

The largest and best equipped foreign trade pier on either the Atlantic or Pacific coast, is called for in the tentative plans of the port of Seattle commission for a proposed second pier on Smith cove. It will be known as pier B, and will be 2700 feet long and 365 feet wide, with a berthing capacity for 30 vessels.

Included in the equipment for the proposed pier, will be two 20-ton portable cranes, each operating on 120-foot steel spans 30 feet above the ground. The cranes will travel 1600 feet up and down the open area of the structure, each crane serving one side of the pier. Two 35-ton locomotive cranes will also travel about the pier. To speed up loading and unloading a battery of electric tractors will be used for hauling trailers. Four depressed railroad tracks are to be installed in the center of the pier, and there will be two tracks at each side of the pier.

New Steamship Company Organized

The New Orleans & South American Steamship Co., capitalized at $500,000, has been formed at New Orleans to operate steam and motorships in regular service between the Crescent City and Cuban, West Indian, Venezuelan, Colombian and Central American ports.

The company plans to move the first of its vessels in September. To form the nucleus of the fleet, W. R. Grace & Co. will turn over to the new organization a steamer of 950 tons now operating out of New Orleans on the gulf. Two motorships of 1950 tons each, and under the 2500-ton government requisition limit, will enter the service later in September, according to announcement by officials of the company. As war conditions permit the return of larger vessels to the gulf trade the New Orleans and South American company plans to add some of them to its fleet.

Rules of the United States shipping board will govern operations of this company, which will serve as a common carrier, handling freight for importers and exporters on equal terms. Sailings are fixed at three a month, and the first steamer will ply between New Orleans and ports on the south coast of Cuba. The incorporators are: Albert Mackie, Hunt Henderson, and E. C. Drewes. The officers are: A. G. Bates, president; A. R. Williams, vice president and general manager; E. C. Drewes, treasurer; and F. W. Beyer, secretary. The directors are E. E. Lafaye, Hunt Henderson, Albert Mackie, Frank Godchaux, A. G. Bates, A. R. Williams and E. C. Drewes.

Soo Canal Report

Freight shipments through the Soo canal to Aug. 1, 1918, exceed those for the same period in 1917 by 1,669,505 net tons. Shipments of iron ore eastbound through the canal during July, 1918, amounted to 10,410,856 net tons. This brings the total shipments for the season to 29,227,120 net tons, a gain of 3,963,559 net tons over last year. On the other hand grain shipments continue far behind those of the 1917 season. In July, 1917, 9,778,068 bushels of wheat and 8,545,448 bushels of grain other than wheat passed eastward through the canal. This year during July only 1,138,342 bushels of wheat and 2,481,626 bushels of grain other than wheat were brought down. Flour shipments for July of this season are greater than those of last, however, 1,379,584 bushels having passed through this July as compared to 1,036,580 during last.

Detailed figures showing comparative shipments for the seasons of 1917 and 1918 follow:

EASTBOUND

	To Aug. 1, 1917	To Aug. 1, 1918
Lumber, M. ft. B. M.	147,318	139,514
Flour, barrels	3,186,768	3,524,314
Wheat, bushels	77,353,023	12,245,812
Grain, bushels	40,737,930	13,481,607
Copper, net tons.....	52,518	42,387
Iron ore, net tons....	25,263,561	29,227,120
Pig iron, net tons.....	2,924	.....
Gen. merch., net tons.	90,245	27,076
Passengers, number ..	7,387	6,811

WESTBOUND

Coal, soft, net tons...	5,159,075	5,736,682
Coal, hard, net tons..	1,046,402	668,866
Iron ore, net tons....	36,985	49,312
Mfctd. iron and steel, net tons	44,838	18,798
Salt, net tons.....	284,486	39,182
Oil, net tons.....	.....	149,034
Stone, net tons.....	.....	243,718
Gen. merch., net tons.	574,331	182,447
Passengers, number ..	7,619	6,521

SUMMARY

Vessel passages, No...	9,577	9,298
Registered tonnage, net	27,882,886	28,504,591
Freight:		
Eastbound, net tons..	29,037,558	30,522,858
Westbound, net tons..	6,903,834	7,088,039
Total frgt., net tons	35,941,392	37,610,897

Book Review

Whys and Wherefores of Navigation, by Gershom Bradford; cloth; 160 pages, 5 x 7½ inches; published by D. Van Nostrand Co. and furnished by THE MARINE REVIEW for $2.

Although many books on navigation have been published, most of them for the guidance of beginners, the author treats his subject from a new angle. While the work is not elementary, it is written in everyday language, especially for the benefit of navigators who wish to know more of the reasons and also for schoolship graduates who desire to extend their knowledge.

The book is divided into 11 chapters as follows: Introductory remarks, nautical astronomy, declination and right ascension, time, correction for observed altitudes, latitude, azimuths and amplitudes, longitudes, Sumner method, the moon and charts.

The chapter on the Sumner method is especially interesting. Every navigator should realize that mariners throughout the world owe a debt of gratitude to Capt. Thomas Sumner, Boston, who in the year 1837 discovered through accident how to work out position lines. The author explains Sumner's method in detail and gives explicit directions for locating a vessel's position through its use.

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Hog Island Yard
has made good
Quistconck First of a Mighty Fleet Launched
Successfully August Fifth—World's Greatest
Shipyard is Now Operating at Full Capacity

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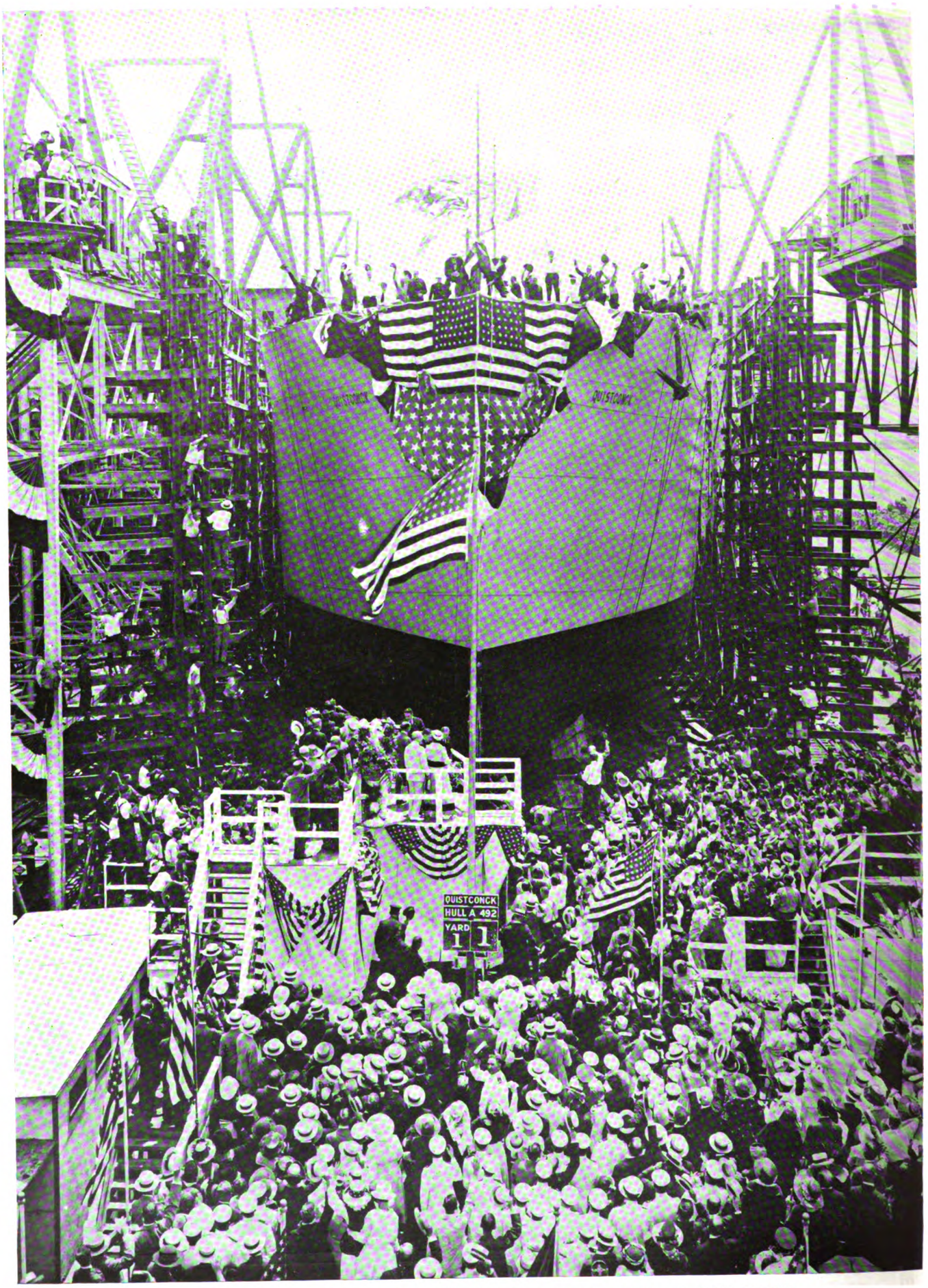

SYMBOL OF SUCCESS—QUISTCONCK STARTING DOWN THE WAYS AT HOG ISLAND

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Hog Island--An American Victory

A Monument to the Tremendous Potency of Co-operative Effort — A Vital Factor in the Success of the War

By H. Cole Estep

CHRISTENED QUISTCONCK by Mrs. Woodrow Wilson, the first ship built at Hog island yard has been launched. This largest of all shipbuilding plants with its fifty shipways, seven fitting-out piers and thirty thousand employes is now in full operation. For Hog Island, the period of preparation and criticism is over and the days of accomplishment and recognition are at hand.

Now that even the man-in-the-street realizes what has been patent for months—that the Hog island yard is a real success and that its mighty fleet of ships will be delivered on time, it is pertinent to inquire into the forces underlying this huge war industry sponsored by the government. Just what is it that has made Hog island a reality? What ideas and ideals have been here worked into being? What, in short, is the spirit of this great enterprise?

We talk glibly enough in this country of spending billions, of putting millions of men in France, of building thousands of ships, and of transforming grass plots into full-fledged factories in a single season, but how many of us have any but the vaguest conceptions of what such achievements entail—what they mean in planning, in organization and in the successful direction of powerful concentrations of energy?

The Imponderable Force

For after all it is intelligently directed energy that builds huge shipyards and big fleets of ships. Without energy, intelligently directed, all the 105,000,000 feet of lumber, the thousands of tons of steel and miles of piping and wiring that have gone into Hog island would be so much inert junk. And the same applies to the 500,000 tons of steel and the 90,000,000 rivets necessary to fabricate the great Hog island fleet. Behind the steel, the lumber, the concrete, the pipes, wires, locomotives, cranes, tools and all the vast assemblage of material at Hog island stand the minds of men.

Not long ago a visitor spent a day at Hog island. Like all others he was given an opportunity to see the whole vast plant. He was visibly impressed, as everyone is who views Hog island with his own eyes. But like most of us, he saw only the obvious and passed by the realities. To the riveters he gave his attention long and earnestly.

"These men," he said, are plainly more important than any others or anything else in our whole proposition. They are the keystone of the arch. Without them the war would stop."

Of such stuff is the conventional point of view. "The riveter, a mighty man is he," sings the modern poet. He is. But he emphatically is not the keystone of the shipbuilding arch. More properly he is the spandrel which the arch itself, represented by the organization, supports. It is the great organization built up by the American International Shipbuilding Corp. that has made possible the manufacture of ships at Hog island. It is true that riveters, hosts of them, are needed, but they are being supplied and where need be, trained at the rate of 200 a week by the organization which stands behind everything at Hog island. It is this organization that makes Hog island what it is, that has transformed a wilderness into the largest shipbuilding plant on earth in less than a year.

"The Know How"—What It Really Is

Through this organization which is more valuable than any commodity; this "know how" which cannot be purchased but must be created, it is possible for the United States, not to build ships but to manufacture them—to strew them over the seas in such profusion that even should the submarines continue their murderous career unobstructed, they would be impotent. Impressive as Hog island is with its miles of waterfront, its forest of cranes, and its acres of tracks and buildings, it is in the things unseen rather than those which are seen that we must seek the spirit of this great achievement.

Now that the organization of the Hog island shipyard is perfected, the nation has a tangible factor on which it can rely for the working out of its shipbuilding plans. Even though the whole vast plant were blown to atoms tomorrow, with the organization intact it could be rebuilt in a few months. Staggering as the loss would be, it would not be comparable to the destruction of the vast systematic machine that now directs the manufacture of ships at Hog island.

Before ship manufacture could be started it was necessary to build the yard itself. Remember that on Sept. 13, 1917, when the first contract for fifty 7500-ton 11½-knot cargo ships was signed Hog island was a waste of grass, weeds and brush. It was not a swamp as has been charged, or even a tide marsh. But its 900 acres were devoid of improvements of every character, save a single squatter's cabin. It was first necessary to create a construction organization which could be counted on to put the big job through in record time and in spite of any difficulties that might arise. Then as the construction force gradually completed its task, it was necessary to develop an entirely different type of organization to operate the plant and build the ships. Toward the end of the building period, it was necessary, in addition, to demobilize the construction organization and merge as many of its elements as possible into the ship manufacturing staff. For a time of course the two organizations, which are of distinct types, worked side by side, their activities being co-ordinated and harmonized by the general management.

For the construction organization, and also to a large extent the operating staff, it was possible to call on the facilities of the Stone & Webster engineering organization, a contracting and operating force of unusual size and success with connections in all parts of the country and many lines of industry. For the operating organization, in addition, the talent developed through many years of activity by the New York Shipbuilding Co., Camden, N. J., was

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available through the control of this concern by the American International Corp., the parent organization for the American International Shipbuilding Corp. The latter corporation was created specially to execute the task at Hog island.

We Thought Panama Was Big

At the beginning of the work, Stone & Webster placed over 400 trained men at the disposal of the newly created shipbuilding company and from them the construction force was selected, with such additions of outside talent as were necessary. The men constituting the original nucleus were called by telegraph from all over the country and were gathered together in practically a week's time.

Surveying at Hog island commenced simultaneously with the signing of the contract. Actual building operations also were begun almost immediately, proceeding into and through the winter without interruption. The construction organization was laid out along standard American lines with a general manager in active charge of the work, surrounded by a staff of trained engineers and practical experts. Engineers predominated because the building of the Hog island plant was essentially a great engineering proposition. Its dimensions from this standpoint may be indicated by a comparison with the construction of the Panama canal, admittedly one of the outstanding engineering feats of modern times. At Panama expenditures were made at the rate of $2,500,000 a month; during the building of Hog island the work progressed at the rate of $10,000,000 a month. Since the rate of expenditure is an accurate measure of the amount of work done and the size of the job, the huge outlines of the Hog island task are vividly delineated by these figures. Even allowing for the rise in wages and cost of materials since Panama days, the job at Hog island is seen to require twice the effort per unit of time.

Through the dark, bitter days of last winter the spirit of achievement, the indomitable Americanism of the men at work at Hog island shone brightest. If there is any place where weather is supposed to cut but little figure it is on the front line in France. We all remember how last November it was announced from Washington, "The allies will continue their offensive all winter—there will be no let up." When the actual test came, however, Mars succumbed to Boreas, and nobody blamed the doughboys. Even the Hun, gnawed to the vitals by his restless desire to be up and at the Franco-British forces before our armies arrived on the scene, lay inactive in his trenches and dugouts. It was no winter for fighting.

Right Through the Winter

But at Hog island the work went on. In times of peace the whole job would have been shut down for two solid months. The orders were to build the ships, for which great task the yard had to be made ready despite the severities of an unprecedented winter. The

Log of the Hog Island Shipyard

1917—
Sept. 13 Contract signed for Hog Island shipyard.
Sept. 19 First load of material received.
Sept. 22 First building, engineers' office, started.
Sept. 23 Dredging started at Old Ferry slip.
Oct. 15 Permanent sewer and water systems started.
Oct. 25 Grading started at head of shipways, group 1.
Nov. 1 Administration building started.
Nov. 5 Pile driving started on group 1, way 1.
Nov. 10 Began work on the electrical distribution system.
Nov. 30 Framing started on ways 1 and 15.
Dec. 1 Started dredging at shipways.
Dec. 3 Started north impounding basin drainage canal, length 2200 feet.
Dec. 5 Framing started on way 40.
Dec. 7 Framing started on way 35.
Dec. 8 Started material storage yard A, 55,189 feet of track.
Dec. 10 Domestic water filter plant and pumping station started.
Dec. 11 Main fire station and mess hall No. 2 started.
Dec. 12 Framing started on way 37.
Dec. 16 Railroad station started.
Dec. 18 Commenced the north impounding basin, length 12,780 feet.
Dec. 24 Started coach and engine yard, 22,950 feet of track.
Dec. 27 Ship template shops A and B started.
Dec. 30 Bates & Rogers started work on model farm.
1918—
Jan. 1 Began work on sewage treatment plant and reservoir for drainage system. Fourteen 100-men living quarters started.
Jan. 2 Started material storage yard B, 60,605 feet of track; holding yards, 16,100 feet of track.
Jan. 5 Started main classification and interchange yard, 47,300 feet of track. Began first wet basin pier, Pier A. Began work on wet crib dike, 3200 feet.
Jan. 6 Bank started.
Jan. 8 Transformer house No. 1 and administration building completed.
Jan. 9 Hospital completed.
Jan. 12 150,000-gallon water tank partially wrecked by wind.
Jan. 17 Bates & Rogers started work on east crib dike, 2500 lineal feet.
Jan. 18 Started west impounding basin and main wharf.
Jan. 22 66,000-volt permanent transmission line completed.
Jan. 25 Railroad station and trade school completed.
Jan. 30 Began work on Pier B, wet basin.
Feb. 1 Started main fuel oil pumping station.
Feb. 7 Post office completed.
Feb. 10 15,000-foot dike completed.
Feb. 12 First keel laid on way 1.
Feb. 13 Twelve 100-men living quarters completed.
Feb. 14 Erection of steel towers started on way 1.
Feb. 15 Shipway administration building No. 1 started.
Feb. 20 Began piling on ways 11 and 12.
Feb. 21 Started Pier C, wet basin.
Feb. 25 North impounding basin drainage canal completed.
Feb. 26 Senate investigation committee visited island.
Mar. 1 Signal system started.
Mar. 4 Concrete tower footings started, ways 22, 23 and 24. North impounding basin completed.
Mar. 8 Lodging house and restaurant completed. Carpenters' strike.
Mar. 11 Template shop in operation. Second keel laid, on way 6.
Apr. 3 Telephone building started.
Apr. 11 Domestic filtration plant completed.
June 1 High pressure pumping station completed.
July 1 Pier B completed.
July 15 Philadelphia railways trolley line in operation to administration building.
Aug. 5 Launched first ship.

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ground froze solid from three to five feet. Pile driving proceeded at a painful pace, but it never stopped. Large boilers were installed and the obstinate soil was thawed with tons of live steam. Over 20,000 shovels and 10,000 picks had been provided for handling earth. Their usefulness except when liberally aided by dynamite was at a low ebb.

Various subcontractors participated in the construction work. As is usual in such cases they furnished their own organizations which worked under the supervision of that of the American International Shipbuilding Corp. The success of the whole undertaking is due in no small measure to their determination in face of the difficulties of the winter. Theirs was the spirit which made it possible to lay the first keel on Lincoln's birthday, 1918; to virtually complete the plant in July, during which month work was progressing on 36 vessels; and to launch the QUISTCONCK, with ceremonies and dignitaries appropriate to such an occasion, on Aug. 5.

If pile driving was slow during the winter, the loss was more than made up by the construction organization when the weather moderated. In June a new world's record was hung up when 165 piles with an aggregate length of 10,259 feet were driven in 9¼ hours by one machine run by a gang of negroes. Such stunts give a new meaning to that somewhat threadbare word, morale. They also prove clearly why the Germans will never survive the world conflagration to which they so blithely applied the torch in 1914.

Of such stuff is teamwork. And in such efforts the individual finds his greatest glory in the achievements of the institution of which he is a part. These achievements, so far as the construction of the Hog island plant is concerned can perhaps best be summed up in the remarks of a man in Chicago when he saw two photographs of Hog island, one taken Oct. 1, 1917, and the other in April six months later. After studying them carefully, this was his comment:

"Well! Well! Well! If that is Hog island, somebody lied!"

The Hog island yard has been thoroughly described in general and in detail in previous articles in THE MARINE REVIEW. These include the following: "Facts About the Hog Island Yard," by George J. Baldwin, March, 1918; "World's Greatest Shipyard at Hog Island Now Busy Building Ships to Win the

Stone and Webster

THE Kaiser did not know whom he was dealing with when he went up against the United States and arrayed such men against him; he underestimated American genius for doing great things with dash and dispatch; now he is finding out that we not only have the right kind of men to do the fighting but the BRAINS to back them; he is learning that we have men with amazing capacity for organization and execution on a vast scale, men who will make his 'supermen' appear like pigmies."

It was the spontaneous statement of one who had insight and intimate information of developments at the Hog Island shipbuilding yards during the past few weeks, and the figures foremost in his thoughts in connection with the enterprise were Stone & Webster.

He had a vivid picture in his mind of the work of this team, a partnership formed at college but 20 years ago, a "moving" picture, indeed, showing how from a little office, barren of business as it was of furniture, in Boston in 1889, they had reached out across the continent, and with no initial capital but their brains, had acquired hundreds of enterprises, chiefly public utility concerns, and had converted them from "forlorn hopes" to "gold mines." He had a picture of the brightest men of the financial world calling on the head of this firm, Charles A. Stone, to direct the $50,000,000 American International Corp., the swift, spectacular stunts in buying steamship lines, building an 1100-mile railroad in China, embarking on big enterprises in South America and Russia, and then the formation of the American International Shipbuilding Corp., converting a swamp into the world's greatest ship producing plant almost over night—and he said with earnestness, pride and conviction in his voice: "The Kaiser did not know whom he was dealing with."

The inspiration for his system came to Stone when an executive "who had organized himself out of a job" applied to him for a position. This executive had trained another man to do his work so that the firm for which he worked might not suffer if he were suddenly called away. The firm promptly cut him off the payroll and put the man he had trained in his place. Stone hired the man on the spot, and instead of organizing men out of jobs Stone began to organize men into jobs. His plan has been to have two men trained for every place in the organization, the primary purpose being to have one man who understands the work thoroughly in case the other is promoted. "Train an understudy for your job if you would be promoted," has long been the watchword in the Stone & Webster organization and this system has proved so efficient that today it is said many of the leading executives at the Hog island shipyards could step out and the work would continue just as smoothly as if nothing had occurred. Stone & Webster efficiency permeates the yard, and many of the big men of that organization are devoting their brains and energies to the cause of the United States. They are of the silent, invisible, invincible army with which the Kaiser did not reckon.

The Stone & Webster Engineering Corp., is, as its name implies, the engineering branch of the Stone & Webster organization, while the Stone & Webster management association deals with management problems. As president of the American International Corp., Mr. Stone was instrumental in organizing the American International Shipbuilding Corp., back of the Hog Island enterprise.

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War," by E. C. Kreutzberg, June, 1918; "Handling Materials at Hog Island," by H. Cole Estep, July, 1918; and "Hog Island's Compressed Air System," by B. K. Price, August, 1918.

As nearly everyone knows, this yard is not a shipbuilding plant in the old conventional sense of the term. Instead it is an enormous ship-assembling plant in which the products of hundreds of separate shops are brought together and worked into finished ocean-going vessels. Hog island, therefore, represents a distinct departure in shipyard design and operation. A map of the yard looks much more like a drawing of a railroad terminal than of a shipbuilding plant.

In fact, the success of the entire Hog island program rests on the speed and precision with which materials are handled, classified, corrected if necessary, and delivered to the shipways where they are needed. Essentially the problem at Hog island is a problem of organization and of handling materials. The organization through which the vast, complex activities of the plant are correlated and directed is the keystone of the arch. It is superior to any individual or group of individuals in the establishment, not excepting the president, the general manager or the omnipotent riveter.

The directors and executives of the American International Shipbuilding Corp. have consciously built their operating organization so that it would be self perpetuating, permanent and independent of individuals, however great their talents. As one high official expressed it, "A dozen of our king pins could quit tonight, and the work would go on tomorrow just the same." This is accomplished by a thorough subdivision and specialization of functions, by the constant education of understudies, and the creation of straight lines of authority and responsibility through which the directing force flows with military precision. Such an organization is of course no more than consistent with the most advanced American ideals of business management, in which individual talents of high order are demanded and used, not individually, but for the benefit of the whole.

There is nothing of magic in such an arrangement, and in the last analysis there is no magic in Hog island. What has been done is simply the logical fruit of the application of engineering and constructive ability through the means of effective organization. It is co-operation brought to a show down. The personalities behind this organization have been content—and this perhaps is a characteristic of engineers—to let their work speak for itself. Speak it does, but it is so vast in outline and complicated in essential detail that its enormous physical bulk, its very immensity, blinds the casual observer to the more important but unseen vital force that lies behind. Hog island is most impressive as a manifestation of the tremendous potency of co-operative effort.

A Glimpse Into Days of Peace

Beyond doubt, war develops man's destructive abilities to a shocking degree, but it also stimulates his creative talents to an equally powerful extent. It brings into being powerful agencies which may be turned to account long after the last barrage has been laid across the fields. This statement applies to the plant at Hog island as well as to its product. Its ships, it is self-evident, will continue to serve useful purposes for the next half century. The yard itself is no temporary affair. Ten of the fifty shipways are concrete which is practically everlasting. The railroad yards, shops, repair facilities, warehouses and outfitting piers taken together form an ideal port development of unrivaled size and capacity, strategically located at the gateway to America's most highly developed industrial section.

The plant, it will be recalled, is laid out along the northern bank of the Delaware river. Its main axis lies in a general easterly and westerly direction. The fifty shipways are arranged in five groups of ten each along the northeastern edge of the property. Each group of ways is 1013 feet in length, and since there are spaces of 142 feet between the groups, the total length of the shipways is 5775 feet, or something over a mile. South of the shipways are the seven fittingout piers which extend along the waterfront for about three-quarters of a mile. Each pier is 1000 feet long, with sufficient berthing space for four ships. There is not a single pier of this length in Philadelphia today, and not many in the country.

The railroad yards lie immediately behind the shipways and fittingout piers. The material enters at the southern end, passing finally to the holding yard at the north end of the property from which it is delivered to the proper shipways. Vast storage yards have been provided in which the steel, etc., is handled to and from cars by locomotive cranes. In a measure, the operation of the Hog island plant resolves itself into a railroad switching problem.

Five Ways to a Unit

While the ways have been built in five groups of ten, they are operated in ten groups of five. Each group is practically a shipyard in itself, with its own administration building, service building, tool building, etc. A track serves each building slip. The material is so handled that each set of ways gets the steel it needs for the day's work the first thing in the morning and continuously throughout the day. This material has all been ordered and fabricated weeks beforehand in accordance with the needs of the situation and by means of the holding yard and the classification of cars into proper trains it is delivered where it is wanted when it is wanted. For handling the material at the ways, wooden stiff-leg derricks mounted on steel towers are employed. There are four derricks on each side of each slip, with two derricks on each tower. Each ship under construction, therefore, is served by eight derricks.

Space does not permit of further description in this article and for additional information, the reader is referred to the previous articles catalogued in the foregoing. It is sufficient to say here that the plant is complete in every detail necessary for its satisfactory operation, including correction shops, a template-shop in which full sized models of engine and boiler-room equipment are set up, tool repair shops, welfare buildings, barracks, service buildings, offices, etc. The buildings including the shops, offices, mess halls, fire stations, police headquarters, living quarters, etc., have an aggregate roofage of over 25 acres.

The original contract of Sept. 13, 1917, called for fifty 11½-knot, 7500-ton cargo vessels to cost $1,050,000 each. On Oct. 23, 1917 a supplementary contract for seventy 15-knot, 8000-ton combined troop and cargo vessels with an estimated cost of $1,650,000 each was signed. The 7500-ton boats are 400 feet and the 8000-ton vessels 450 feet long. Recently another contract calling for sixty more of the 7500-ton cargo ships has been negotiated, so that now Hog island has orders for one hundred and eighty vessels.

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Some of the Men Behind the Job

CHARLES M. SCHWAB

EDWARD N. HURLEY

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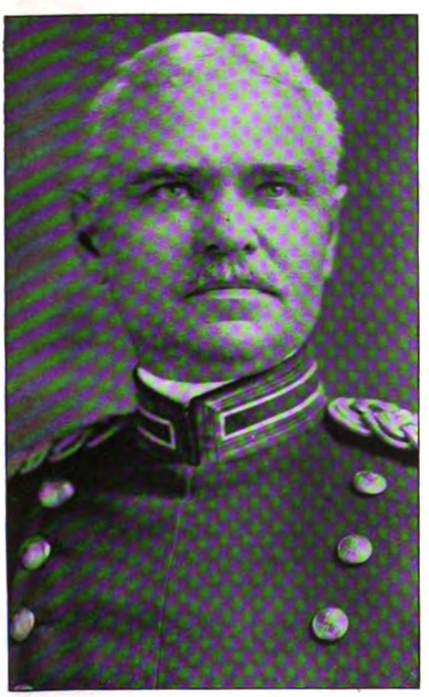

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GEORGE W. GOETHALS

HOWARD COONLEY

CHARLES PIEZ

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These vessels are not being built on the cost plus percentage basis but on the cost plus fixed fee basis. The latter is vastly different from the former, since with the fixed fee, the percentage of profit to the contractor depends on his abililty to get results, to turn his capital over rapidly and get the most out of his investment in land and organization. As an additional incentive, bonuses are paid for speed and for reducing the cost, with appropriate penalties for reverse results. The fee for the 7500-ton ships is $55,000 each, while that for the larger vessels is $82,500 each. These may be reduced by penalties to $41,000 or $65,000, respectively.

Let us now return to the backbone of the job—the organization. As previously explained, each set of five ways is operated as a complete yard in itself, with its own equipment, buildings, superintendent and working force. This subdivision makes it possible to obtain the efficiency that comes only from relatively small operations which can be closely supervised by competent leaders who get to know their men by their first names.

Tasks common to the entire yard are handled, of course, by the general staff. In addition to the management, this includes the employment department, labor adjustment department, welfare work, safety organization, accounting, material checking, etc. To describe the manifold activities of these various agencies would require a volume. An instance or two will suffice to show the spirit, the punch that makes Hog island what it is.

The Ribbon Counter Boys

As soon as General Crowder's famous work-or-fight order went into effect, the employment department at Hog island was deluged with applications from clerks, salesmen, soda-fountain dispensers, etc., all seeking to become shipbuilders. Few of this horde had the physical stamina required for such work or the manual dexterity possessed by even the unskilled laborer. Measuring ribbon has no effect on the biceps. These men, however, were not turned away. Promptly a special instruction course was organized for their benefit, designed to build them up and fit them for heavy outdoor work. At present 200 a day are being hired, and after suitable training they develop into the best kind of workmen, free entirely from the conventional labor point of view. Their course of instruction and training has been carefully worked out to accomplish maximum results in minimum time. At first they are set to picking up rubbish, light lumber, etc., in order to learn how to bend over. Gradually the work grows heavier until the ribbon counter brigade becomes a regiment of hard-hitting shipbuilders.

Speed is the essence of the job at Hog island, and speed it is. Recently a single gang working on the steamer SCHOHARIE placed 148 tons of steel in 3½ hours. And the best of it is, they like it.

The Hog island organization includes a training school with a teaching staff of 60 experienced shipbuilders. This great institution builds men as well as ships. Already over a thousand have been put through the course, graduating with increased earning capacity and the self respect that goes hand-in-hand with special skill. These men can do things, and they know it. Recently one of the graduates of the riveting school, after seven days' instruction, drove 1327 ¾-inch flush rivets in a single shift. This is as many as men with five years' experience drove at the outbreak of the war.

Into each of the ships at Hog island goes 20,000 articles. These articles are collected from all over the country. Over 50 fabricators are constantly employed on the preparation of the steel. Since the work that is finally assembled at Hog island originates in scores of widely scattered shops, the organization of the American International Shipbuilding Corp., of necessity, reaches out all over the country. In fact, the whole scheme of fabricating ships in quantity would fall to the ground were it not supported by a powerful organization carefully designed to keep all parts of the vast machine moving in unison, to the end that the flow of materials to the launching ways shall always be proportioned to the maximum capacity of the men at the final end of the job.

Hog island, so named some 249 years ago, will bulk large among the industrial achievements of the great war. In fact it has a place in history itself. It is a name that will ring down the corridors of time. Its work stands at the very base of our wartime efforts. Pershing's bridge, its great spans reaching from America to France, is being built.

"Sizing Up" World's Biggest Shipyard

HOG ISLAND is the greatest shipyard in the world. It is as big as the Cramps, Fore River, Maryland Steel, Newport News and the New York Shipbuilding and Union Iron Works yards combined at the beginning of the war.

The total number of ways in Great Britain is 209; at Hog Island there are 50, practically one-quarter as many as in all Great Britain, which has been the greatest shipbuilding country in the world.

All the heroism of the war is not in the trenches, thousands of men having worked on the island through wind, storm and cutting cold, in water, slush and frozen mud, hundreds of men last winter having frozen their hands and feet. Executives worked for months 12, 14 and 16 hours a day, quite a number having died from exposure and overwork.

Each of the ships requires approximately 20,000 articles and the corporation is doing business with 3500 concerns in the United States and Canada.

Based on records of submarine losses the yard will supply the additional ships necessary to maintain the world's tonnage.

The contract for the ships, involving approximately $200,000,000, is the largest single contract ever awarded in the history of the world.

Actual work on ships began when the yards were only 50 per cent completed.

The corporation claims that beginning this summer it will launch ships at the rate of two or three a week, or practically a ship every other day until it has set afloat a merchant marine of 1,400,000 tons capacity.

The land, comprising 846 acres, was bought by the shipbuilding corporation at the request of the shipping board at $2,000 an acre, an army officer who held much of the land at $2,500 an acre selling at the reduced price when he learned the government wanted it. The total investment was $1,700,000. The corporation claims it did not make a dollar of profit on the transaction.

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Francis Tiffany Bowles

ONE of the most responsible jobs at Hog Island and the most important from the standpoint of the government's interest is that held by Rear Admiral Francis Tiffany Bowles. As assistant general manager of the Emergency Fleet corporation in direct charge of both steel and wood ship construction, Admiral Bowles has it in his power to approve or veto any proposal for expenditure of funds or plan for construction at Hog Island, and on him the government depends to obtain the maximum of production in the most economical manner consistent with best results. He is relied on to protect the government's interests from a financial as well as technical standpoint and his co-workers at Hog Island testify that "he knows the game." The judge may not always render decisions satisfactory to both sides, the "watchdog of the treasury" may expect a few growls, but it is recognized that Admiral Bowles possesses the experience, the ability and the vision necessary for his task. His word is law and it is respected as such.

REAR ADMIRAL FRANCIS TIFFANY BOWLES

Admiral Bowles' name occupies a conspicuous place in the records of the American navy and merchant marine for the past 36 years. He has been associated with the building of the new navy from its beginning and while he was in retirement when the United States declared war he was one of the first men the government called back into service as one of the mainstays in the program to "bridge the Atlantic" with ships.

Admiral Bowles was born in Springfield, Mass., Oct. 7, 1858, and graduated from the United States naval academy when 21 years old. He obtained a post-graduate degree of naval architect from the Royal Naval College, Greenwich, England. He studied English methods of shipbuilding so effectively that in later years when the Argentine government was about to place an order for two battleships in England he convinced that government that its ships could be built to better advantage in the United States, and in the face of the hottest kind of competition brought home the contract.

Admiral Bowles was a member of the naval advisory board in 1882; he was head of construction and repair in the navy yards at Norfolk and New York 14 years, and was chief constructor for the navy from 1901 to 1903, when he became president of the Fore River Shipbuilding Co., Quincy, Mass.

During his connection with the navy, the admiral was active in promoting civil service reform in the employment of labor in the navy yards, and he has devoted much attention to improving labor conditions at Hog Island, urging the passage of legislation to increase housing facilities.

It's a pretty big job, "bossing" the "bosses" at Hog Island, holding the purse strings on approximately a $100,000,000-a-year expenditure at a $50,000,000 plant, directing the work and looking after the personal welfare of the men and keeping the machine running so smoothly no jolts nor jars are heard at Washington, and if you don't think it is, do as they all do as Hog Island and just "ask Bowles."

No official at Hog Island has been a more indefatigable worker than Admiral Bowles. While employes at various plants may fight for an 8-hour day Bowles' job has been a 16-hour propostion, and yet his gospel is to give the workers a "square deal." Establishing confidence of employes in the government's attitude has been an important factor in his success.

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Officials of Hog Island Shipyard

CHARLES A. STONE is president of the American International Corp., the $50,000,000 enterprise launched in 1916 to promote American trade and industry in foreign lands, and was one of the chief organizers of the American International Shipbuilding Corp. Having built up one of the largest engineering, construction, promoting and financing businesses in the world as leading member of the Stone & Webster companies, Boston, Mr. Stone was enlisted by the leaders of American finance to take command of the great commercial campaign, backed by billions of dollars, which was to link the United States to other nations by new trade ties and push American enterprise to the four corners of the earth. He has genius for organization, amazing capacity for "putting over" large enterprises involving vast expenditures and extending over wide areas. The building of 1100 miles of railroads in China, colossal construction work in Russia, a multiplicity of business enterprises in South America, the acquiring of control of the Pacific Mail Steamship Co., part ownership of the International Mercantile Marine Co., and the United Fruit Co., were among the immediate achievements of Stone in this world-wide field. When war was declared by the United States the need for ships led to the formation of the American International Shipbuilding Corp., an easy matter for Stone and his associates with the resources of the International corporation at their command.

CHARLES A. STONE

GEORGE J. BALDWIN, senior vice president of the American International Corp., and chairman of the board, American International Shipbuilding Corp., is one of that group of brilliant men identified with the successes of the Stone & Webster organization, which he joined in 1898. Trained as a mining engineer and chemist, one of his first business enterprises was organizing the Baldwin Fertilizer Co., in Savannah in 1887. Later he organized the Edison Electric Illuminating Co., of Savannah, and became identified in executive capacities with the Jacksonville Traction Co., Tampa Electric Co., Pensecola Electric Co., the Key West Electric Co., the Gainesville Midland railroad, the Columbus (Ga.) Railroad Co., the National Bank of Savannah, and the Chatham Bank & Trust Co., Savannah. Through his connection with Charles A. Stone he became identified with many public utilities and manufacturing concerns and was president of the Pacific Mail Steamship Co., of which the American International Corp., obtained control.

GEORGE J. BALDWIN

WALTER GOODENOUGH, general manager, American International Shipbuilding Corp., to whose ability for organization much of the success at the Hog Island yards is due, was also identified with the Stone & Webster organization, which he joined July 1, 1906. One of his first assignments for the latter firm was to organize its various interests in the southwestern district. When the work was done he returned to Boston to take charge of mechanical engineering problems for the firm. He had specialized in marine engineering and went to sea on the Great Lakes that he might know what he was designing, what was being built and why it was done. His knowledge of marine engineering and his ability to deal with large groups of workmen led to his appointment to his responsible position.

FREDERICK HOLBROOK, Boston, who as president of the American International Shipbuilding Corp., is the head of the Hog island shipyard is also vice president of the American International Corp., and vice president of Holbrook, Cabot & Rollins, the Boston firm which outfitted the piers at Hog island.

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When the Quistconck Was Launched

Presence of President and Wife, Leaders in National Affairs and Thousands of Guests and Workmen Combine to Make First Launching Notable

By R. V. Sawhill

HOG ISLAND'S first launching was planned with the same precision and success which made the construction of the gigantic yard rank as probably the greatest industrial achievement of the war. The date had been selected months ago, a 24-hour postponement being made during the final week, to meet the wishes of President Wilson. Arrangements for the actual launching were so carefully planned that the boat started her rapid but graceful glide into the waters of the Delaware as soon as Mrs. Woodrow Wilson, the sponsor, had taken her stand in front of the bow.

The launching stands without a parallel in the long and checkered history of American shipbuilding. The QUISTCONCK, bearing, as she did, the old Indian name for Hog island, brought one thought uppermost in the minds of the multitude assembled from all corners of the nation to witness the launching of this ship. She symbolized the practical completion of the greatest shipyard in the world—a plant constructed even more rapidly than anticipated, constructed largely throughout a winter of unexampled severity, and constructed during a period when America was undergoing the greatest industrial transformation in her history while shifting from a peace to a war time basis. She symbolized another American conception equally vigorous and surcharged with possibilities for the future. This idea is the adoption of fabricating methods to ship construction, the transformation, in other words, from the unit to the quantity basis of ship production. Chairman Hurley of the shipping board predicts that when the war ends, the United States will be the master of quantity methods in ship production. Hog island, while not the original testing ground for this idea, will stand as the yard where the plan received its greatest test.

PRESIDENT WILSON permitted the announcement of his intention to witness the launching to be made public only a few hours beforehand. He arrived at the island a few minutes after 12 o'clock, his special train being backed on a yard spur to within a few feet of the christening stand. He was accompanied by his wife, Mr. and Mrs. E. N. Hurley, Charles M. Schwab, and was met on the launching platform by Frank A. Vanderlip, Charles A. Stone, Theodore N. Vail, Joseph P. Grace, George J. Baldwin, Frederick Holbrook, Walter Goodenough and G. O. Muhlfeld, of the American International organization, and by Charles A. Piez, Howard Coonley and Rear Admiral F. T. Bowles, of the Emergency Fleet corporation. The huge crowd gave enthusiastic cheers as the President and his party took their positions in the christening stand. The President, who appeared to be in the best of health, showed his pleasure at the ovation which greeted him. Mrs. Wilson was instructed in her duties as sponsor by Assistant Superintendent Workman and only a few moments later revealed the thoroughness with which she had followed the suggestions. The boat started quickly on her way to the river and Mrs. Wilson smashed the bottle fairly across the bow as she christened the ship QUISTCONCK. The President's party returned to Washington almost immediately, the special train leaving the yard within 35 minutes after its arrival.

AN unexpected incident of the christening brought forth the applause of the crowd and demonstrated at the same time that the close cooperation between Chairman Hurley and Director General Schwab is capable of meeting any emergency. As Mrs. Wilson vigorously smashed the bottle, the wine spattered freely upon her dress. Chairman Hurley gallantly offered his handkerchief to remove the wine, while Mr. Schwab, with the boat sliding easily down the ways, siezed Mrs. Wilson's hand to congratulate her.

Hog island probably will never witness a launching under equally favorable conditions. The American International Shipbuilding Corp. had made every effort to celebrate the importance of the event in a fitting manner. The yard immediately around shipway No. 1 had been cleared and suitable stands, fences and walks, constructed to handle the crowd. The great railroad yards designed for the rapid handling of materials were cleared and were given over to the equally rapid handling of the great number of special trains which brought the spectators to the island. Special trains and boats were provided in adequate number to take care of 75,000 to 80,000 people and every facility was needed. A special stand immediately behind the sponsor's platform accommodated 300 prominent leaders in governmental, military, and commercial fields. Immediately surrounding was a fenced-in area for 7500 guests and surrounding these were thousands of workmen and their guests. The large island police force had been especially drilled, and handled the crowd with practically no confusion. A test of the arrangements was made as a result of the heat, 178 persons being overcome and being handled entirely by the yard's ambulance and hospital corps. All of the patients were able to leave the yard within two hours after the christening. Tables and lunches had been provided for the 7500 guests.

WORKMEN of the yard, particularly the crew which had built the QUISTCONCK, were prominent in the day's activities. Each workman of the yard was enabled to bring two guests, and most of them took advantage of this offer. The honor crew had positions of vantage immediately around the hull where they had unobstructed views of the launching. The QUISTCONCK workmen, through Foreman

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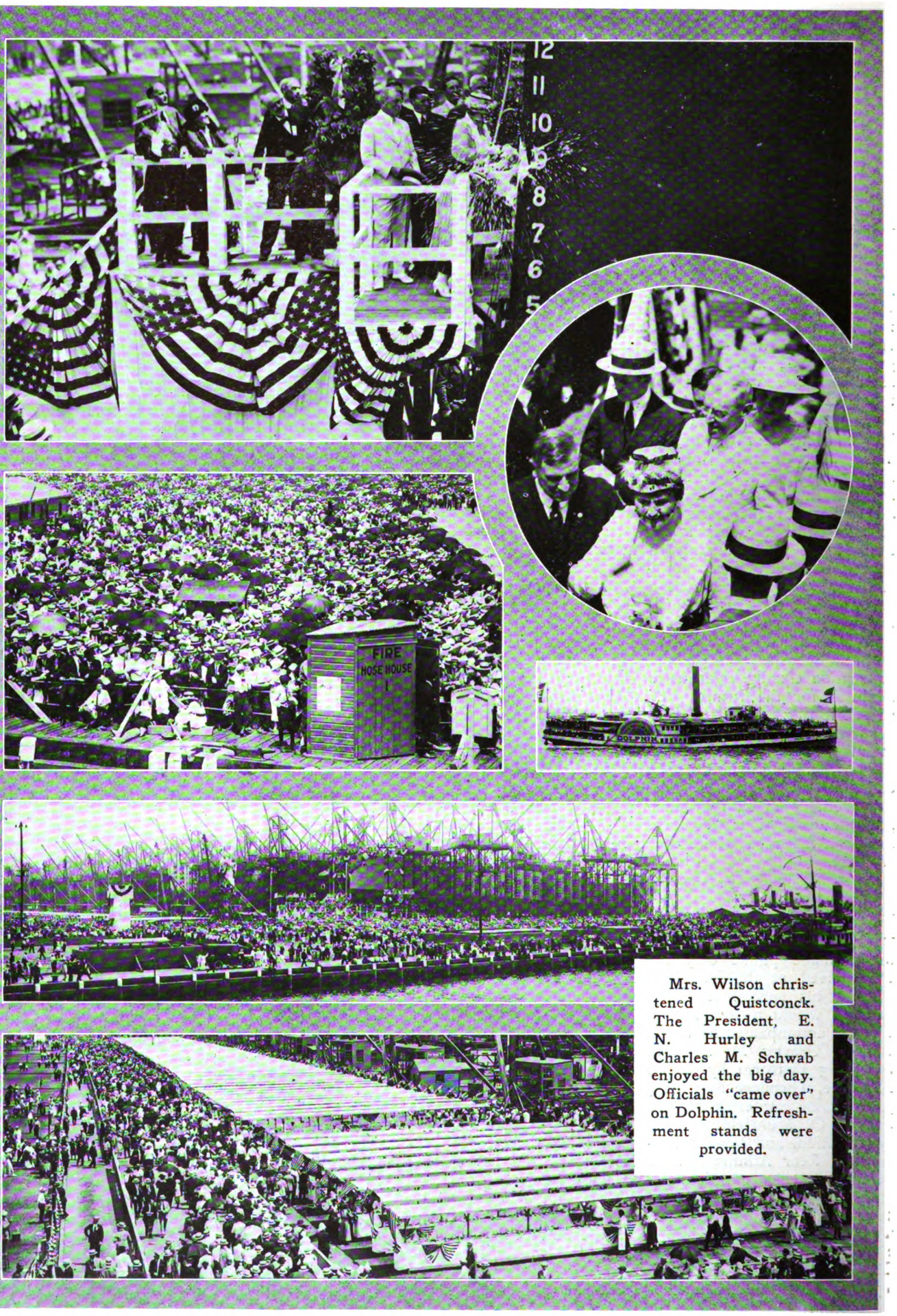

Mrs. Wilson christened Quistconck. The President, E. N. Hurley and Charles M. Schwab enjoyed the big day. Officials "came over" on Dolphin. Refreshment stands were provided.

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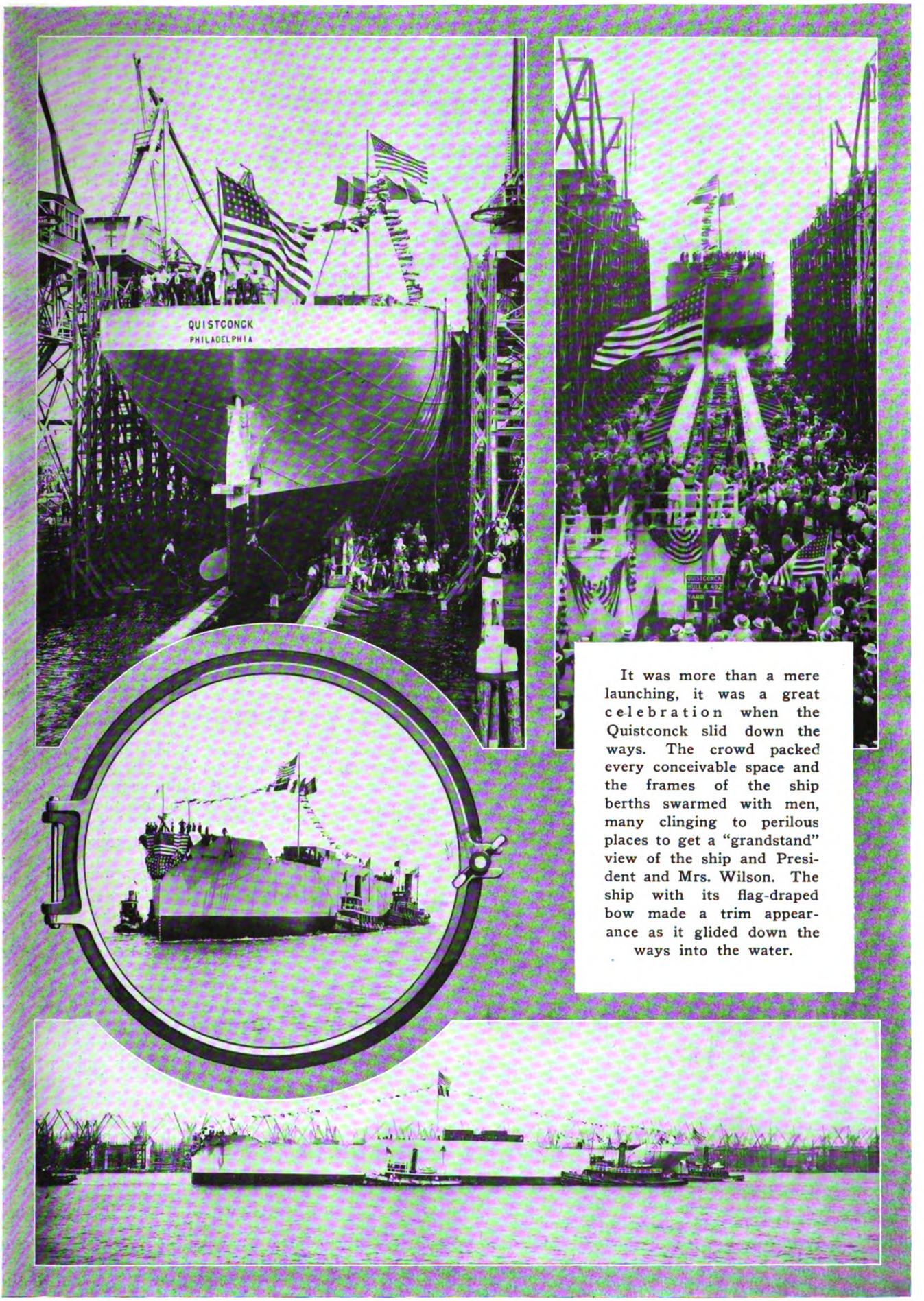

It was more than a mere launching, it was a great celebration when the Quistconck slid down the ways. The crowd packed every conceivable space and the frames of the ship berths swarmed with men, many clinging to perilous places to get a "grandstand" view of the ship and President and Mrs. Wilson. The ship with its flag-draped bow made a trim appearance as it glided down the ways into the water.

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McMillan, presented Mrs. Wilson with a beautiful bouquet. A holiday had been given to practically all of the employes, one of the few exceptions being the men who laid the keel for a new boat immediately after the QUISTCONCK had been launched.

THE long battle line of derricks facing the Delaware river, serving the fifty ways of this great yard, the seven 1000-foot fitting out piers with all their attendant array of storage and service tracks, with buildings and plants of many sorts supplying the thousand needs of the army of 50,000 men who will build the ships, lie spread before you on either hand almost as far as the eye can see," said George J. Baldwin, chairman of the board of directors of the American International Shipbuilding Corp., in a prepared address. "Less than 11 months ago the marsh hen and the mosquito held undisputed sway over the thousand acres of marsh on which this shipbuilding plant now stands, a living testimony to the power of the government we have created and to which we have pledged our undivided allegiance as well as to the organized loyalty of the men who have given their utmost devotion to an ideal which they had the vision to see before them and the power to convert into reality.

"The yard, its organization and its ships stand as the typical embodiment of the spirit of the nation, the great accomplishment of a people inspired by an ideal, fired by enthusiasm to crystallize it, prepared by training and experience to make it a fact, and daring in overcoming all obstacles.

"On Sept. 13, 1917, the United States government, through the Emergency Fleet corporation, selected the men of the American International Shipbuilding Corp. and asked them to construct in six months a yard capable of delivering annually three times the tonnage that had ever been turned out in the United States in any one year, and in another year to create an army of shipbuilders and to build a fleet of merchant ships almost as large as the entire sea-going merchant tonnage then under the United States flag. The task seemed an appalling, yes, an impossible one, but we knew it must be done, and when the Emergency Fleet corporation, authorized by congress and our President, pledged the entire power of the country to forward the enterprise, we knew it could be accomplished.

"The safety of the country and the winning of the war depended upon the construction of ships in such vast numbers that in no other way could they be produced than according to the plans devised and adopted by the three great fabricating yards, in which our half of the total was to be produced.

"This moment when our hopes are becoming realized is no time to tell of the difficulties encountered and overcome, not the least of which has been the destructive force of the doubts of those harsh critics and pessimists who hamper all great enterprises, but I must say a word of praise for the engineers who planned and supervised the construction of the yard and the vessels, for the officers who have carried the work forward, and for the men in the ranks who fought a winter as bitter as did their forefathers at Valley Forge in 1777-1778, who fought it in the same cause of human liberty and freedom, and it will be fitting that some memorial be erected on this spot to those who have laid down their lives here on this battlefront on the Delaware.

"But, fighting here in aid of our brothers and sons in France, those of us who have borne the strain have only gathered the many threads for the weaving. We have gathered and are putting together the many parts of the ship made by hundreds of thousands elsewhere in a thousand cities scattered throughout the nation. To no one man or set of men is due the entire credit of this colossal venture but to the entire mobilized power of the nation guided and directed by the engineers of the yard.

"It is the accomplishment of the nation, of which every American must feel proud, and it is therefore fitting that the first lady of the land has consented to name these vessels and to herself send the first one into the sea. This gracious act has especially gladdened our hearts and encouraged us in our work, because whatever has been accomplished here was done under the wise leadership and inspiration of our great President, whose presence here today testifies to the national pride every American must feel in the possession of this vital factor in our war for liberty.

"I present to the American people a more powerful ship assembling plant than the world has ever seen before, backed by a drilled and organized army of loyal shipbuilders pledged to deliver into your services 1,600,000 tons of ships each year until the war is won."

THIS launching," Chairman Hurley stated in a prepared address, "marks another milestone in America's progress in the war against the German government. It marks the beginning of quantity production of ships in all the yards of this nation.

"It is doubtful whether any nation ever would have undertaken a shipbuilding program on such a large scale if Germany had not plunged the world into war. We are in it now, and we are going through with it. We are producing more tonnage today than the submarines are sinking, and from this time forward our great task will be to replace the tonnage that was lost in the days when we were far behind in the nerve-racking race with the sharks of the sea.

"We have made tremendous strides in the shipbuilding program, and I doubt whether I will ever have a better opportunity to state that the vast scope of this program was due to the vision of the President.

"We are going through with the shipbuilding program to the finish, and we are going through with the war to a finish. The American government is planning for a long war, because enduring peace will not be in sight until the militaristic system of Germany is broken. Nothing else will convince Germany of the supremacy of right over might. Nothing else will convince her that weak nations are not the natural prey of the strong.

"Even then, the shipbuilding program of America must go on. It will take five years to complete the program and place at the service of mankind a merchant fleet that will make enduring peace by bringing nations closer as the eastern and western and northern and southern states were brought closer by a nation-wide system of railroads. The end of the war will find America master of the process of quantity production of ships. We will build ships for ourselves and for the world.

"The men who have worked on this ship launched today and on other ships that are being launched are makers of a new America. Through the efforts of the shipyard workers, a large army is now in France and through their continuous work, an army steadily growing larger and larger eventually will overwhelm the carefully constructed military machine with which Germany has sought to dominate the world."

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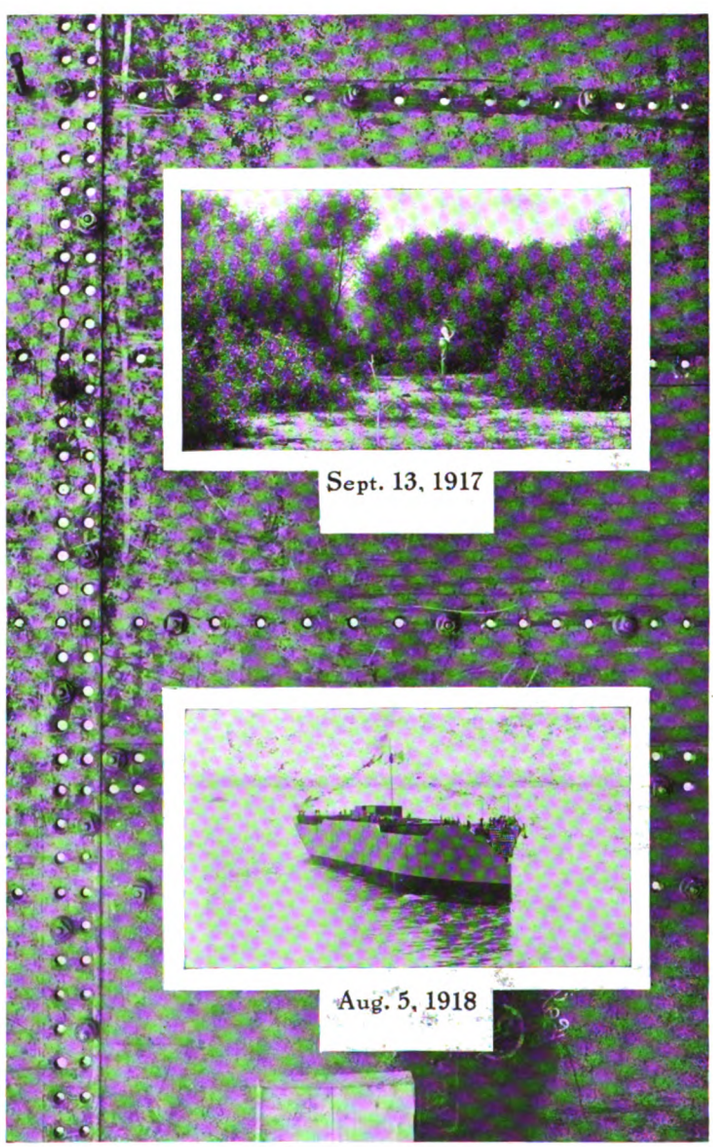
The Pictorial Story of Hog Island,

The Symbol of the Nation's Will to Win

One of the nation's most noteworthy achievements in the war against Prussianism visualized as it was developed, step by step, from Sept. 13, 1917, the day of signing the contract between the government and the American International Shipbuilding Corp., and Aug. 5, 1918, the launching of the first ship —How American engineers with but one thought, "ships and yet more ships", built on barren fields the supreme embodiment of shipbuilding science in less than ten months and set 1,400,000 tons of shipping arolling from its 50 ways—Scenes and incidents in the life of the city of 30,000 busy shipbuilders —How the *Quistconck* was "manufactured", from the laying of the keel in the snow, through the various stages until it became a living emblem of freedom, flag-draped, with the pean of 90,000 voices, speeding it, the first-born, on its mission.



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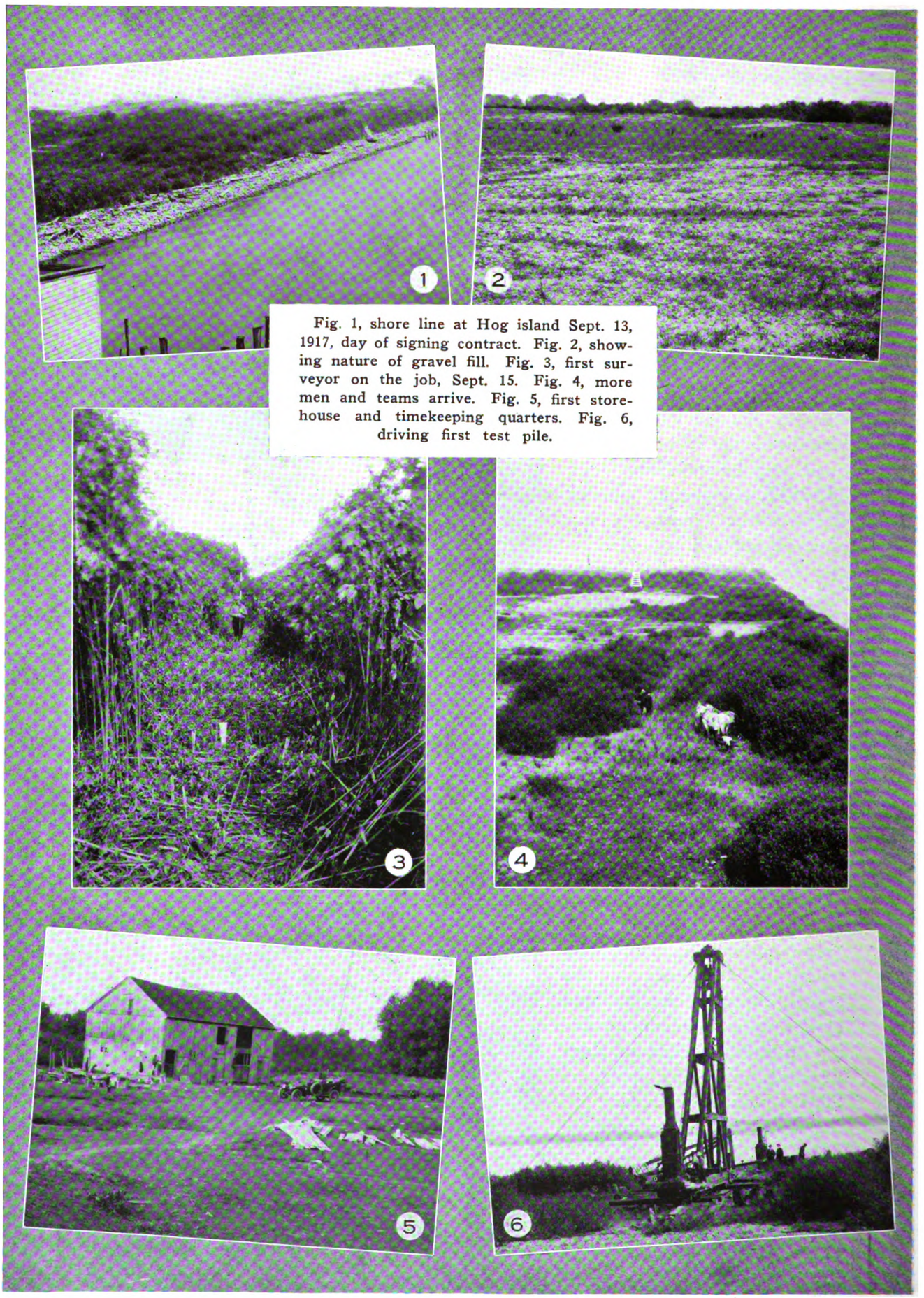

Fig. 1, shore line at Hog island Sept. 13, 1917, day of signing contract. Fig. 2, showing nature of gravel fill. Fig. 3, first surveyor on the job, Sept. 15. Fig. 4, more men and teams arrive. Fig. 5, first storehouse and timekeeping quarters. Fig. 6, driving first test pile.

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Fig. 7, workers' camp. Fig. 8, driving concrete piles. Fig. 9, administration buildings. Fig. 10, hospital. Fig. 11, dredges icebound. Fig. 12, excavating street. Fig. 13, piling, Group 1.

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Fig. 14, construction, proceeding rapidly despite severe winter, unfolds busy scene west from way group No. 3. Figs. 15 and 16, way group No. 3 as it appeared in December, 1917. Fig. 17, making cut for railroad spur to shipways 1, 2, 3 and 4 in frozen ground.

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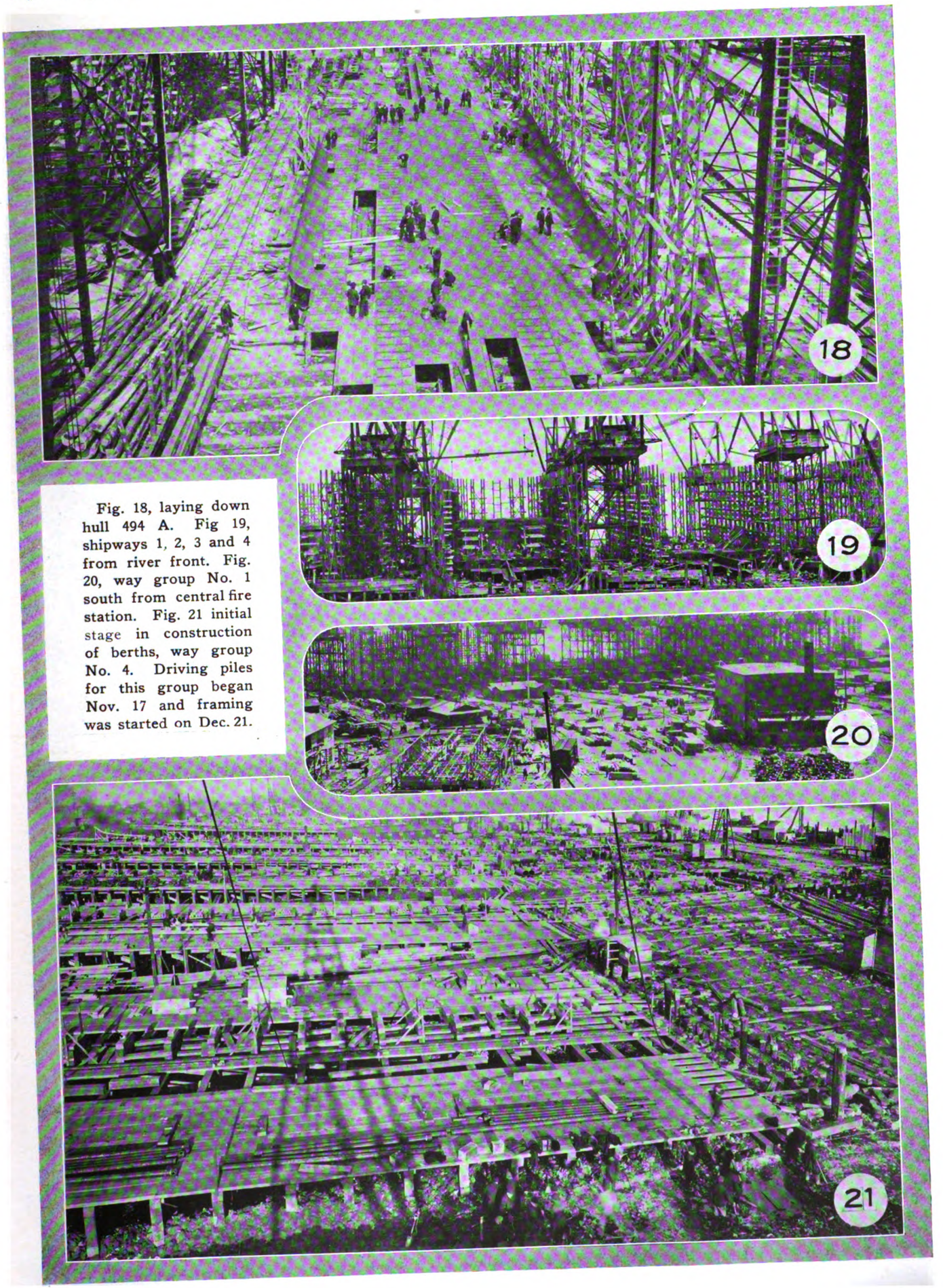

Fig. 18, laying down hull 494 A. Fig 19, shipways 1, 2, 3 and 4 from river front. Fig. 20, way group No. 1 south from central fire station. Fig. 21 initial stage in construction of berths, way group No. 4. Driving piles for this group began Nov. 17 and framing was started on Dec. 21.

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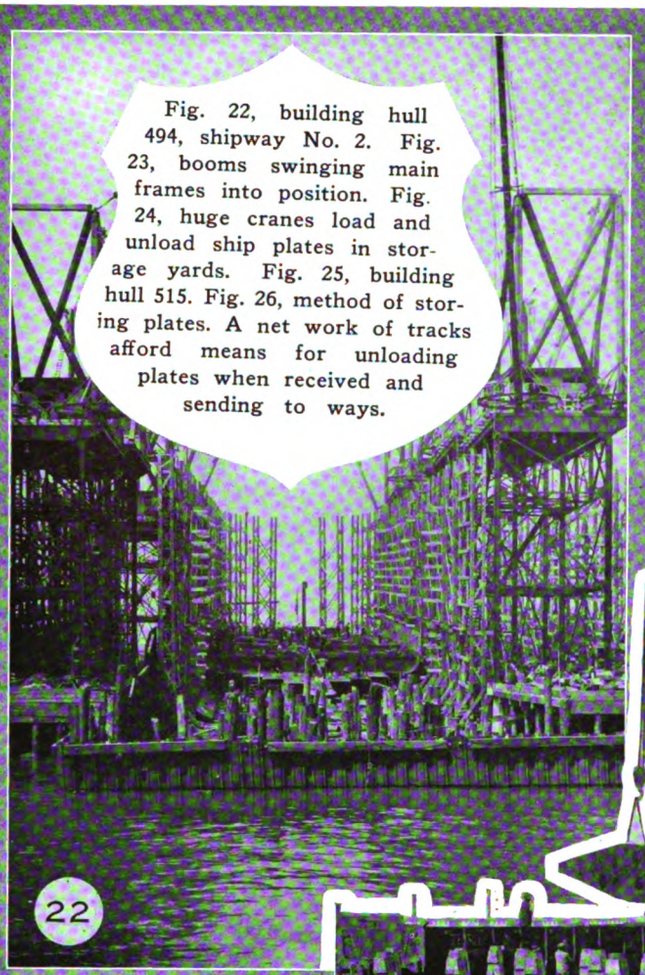
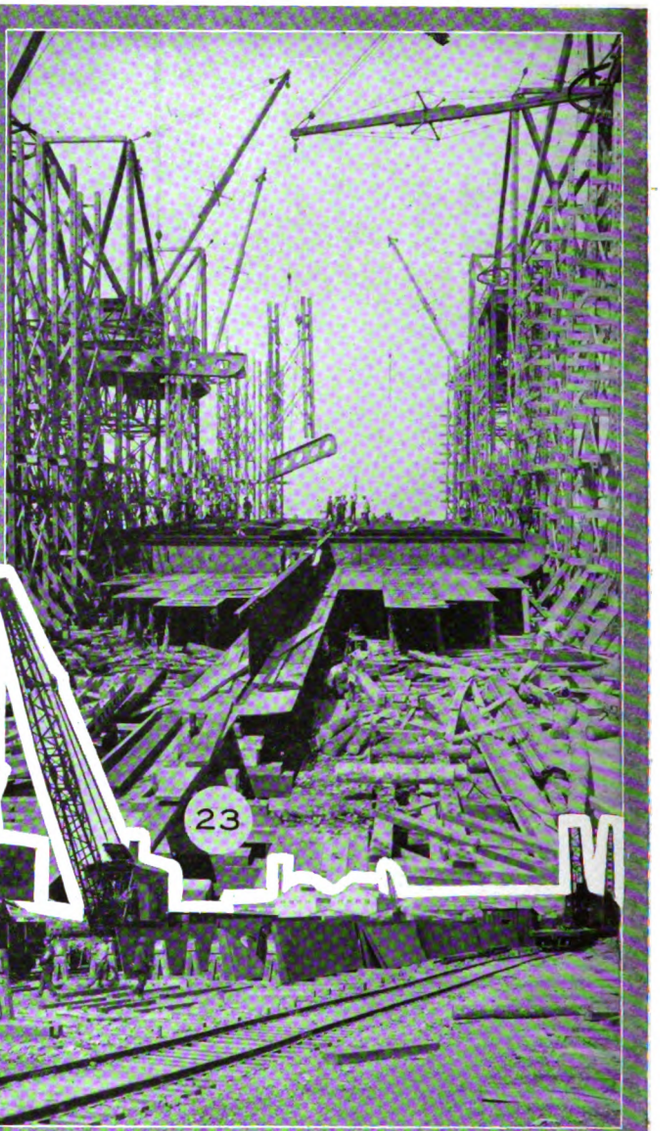
Fig. 22, building hull 494, shipway No. 2. Fig. 23, booms swinging main frames into position. Fig. 24, huge cranes load and unload ship plates in storage yards. Fig. 25, building hull 515. Fig. 26, method of storing plates. A net work of tracks afford means for unloading plates when received and sending to ways.





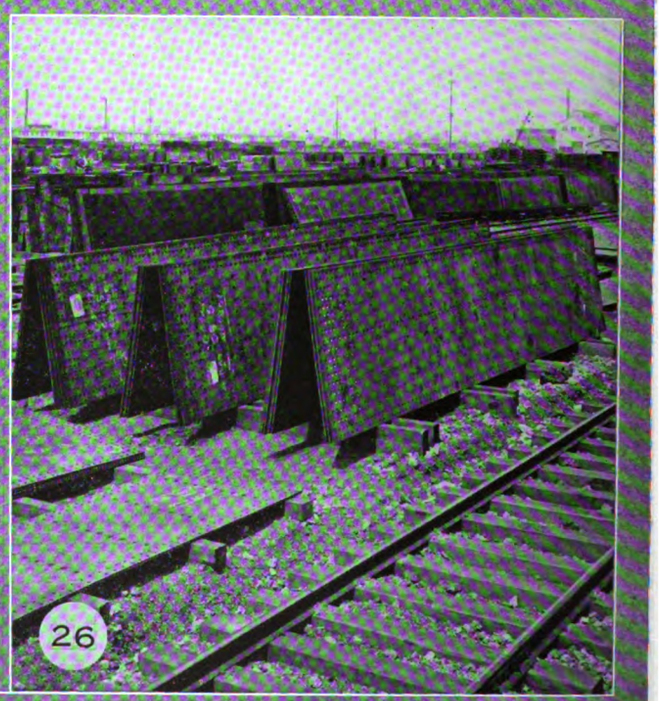


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Fig. 27, shipways 1 to 50 as viewed from river. Fig. 28, engineering building. Fig. 29, administration building. Fig. 30, general view of workmen's barracks. The problem of housing the employes was serious when the great influx was in progress but it has been solved by the building of comfortable quarters.

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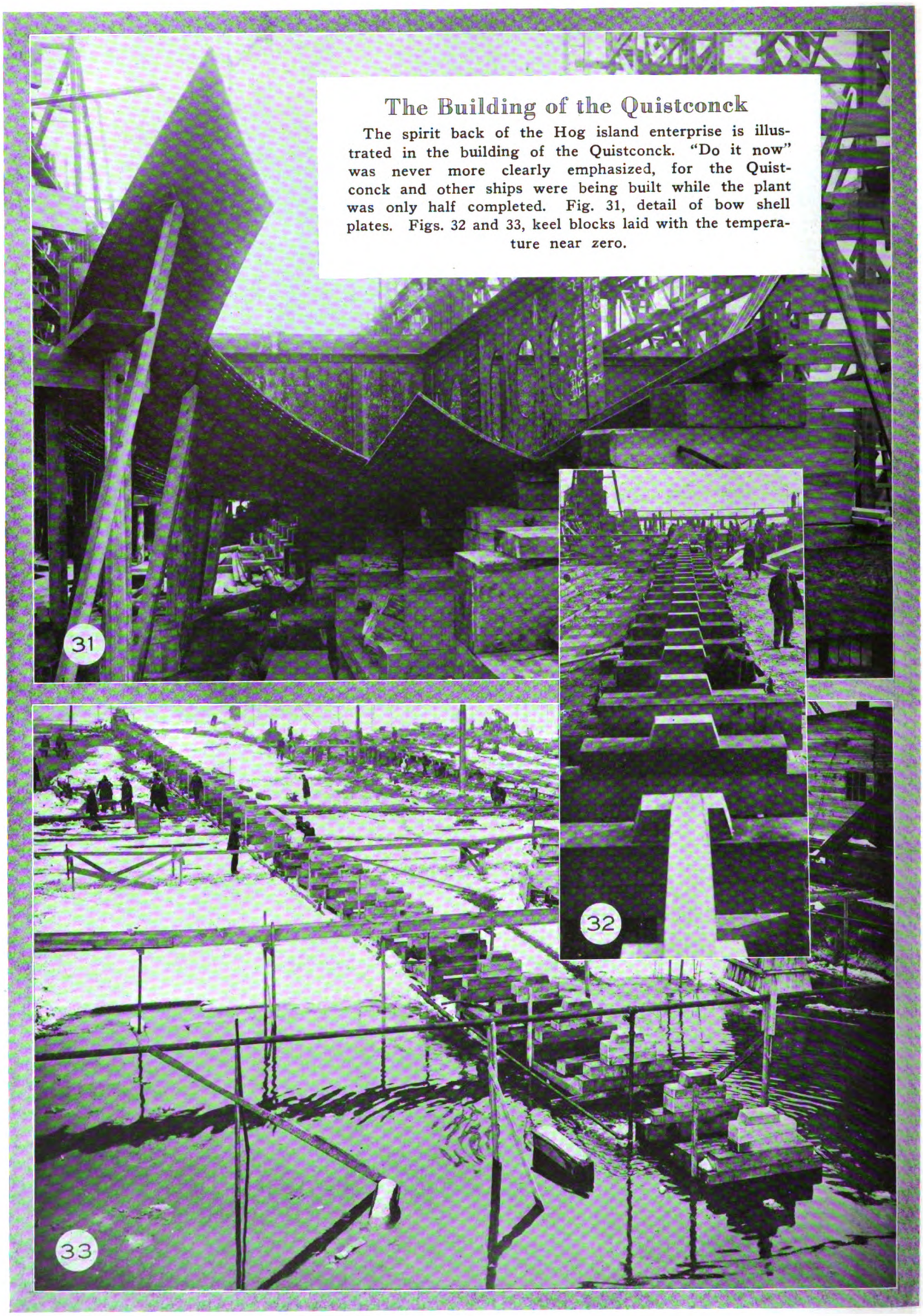
The Building of the Quistconck

The spirit back of the Hog island enterprise is illustrated in the building of the Quistconck. "Do it now" was never more clearly emphasized, for the Quistconck and other ships were being built while the plant was only half completed. Fig. 31, detail of bow shell plates. Figs. 32 and 33, keel blocks laid with the temperature near zero.



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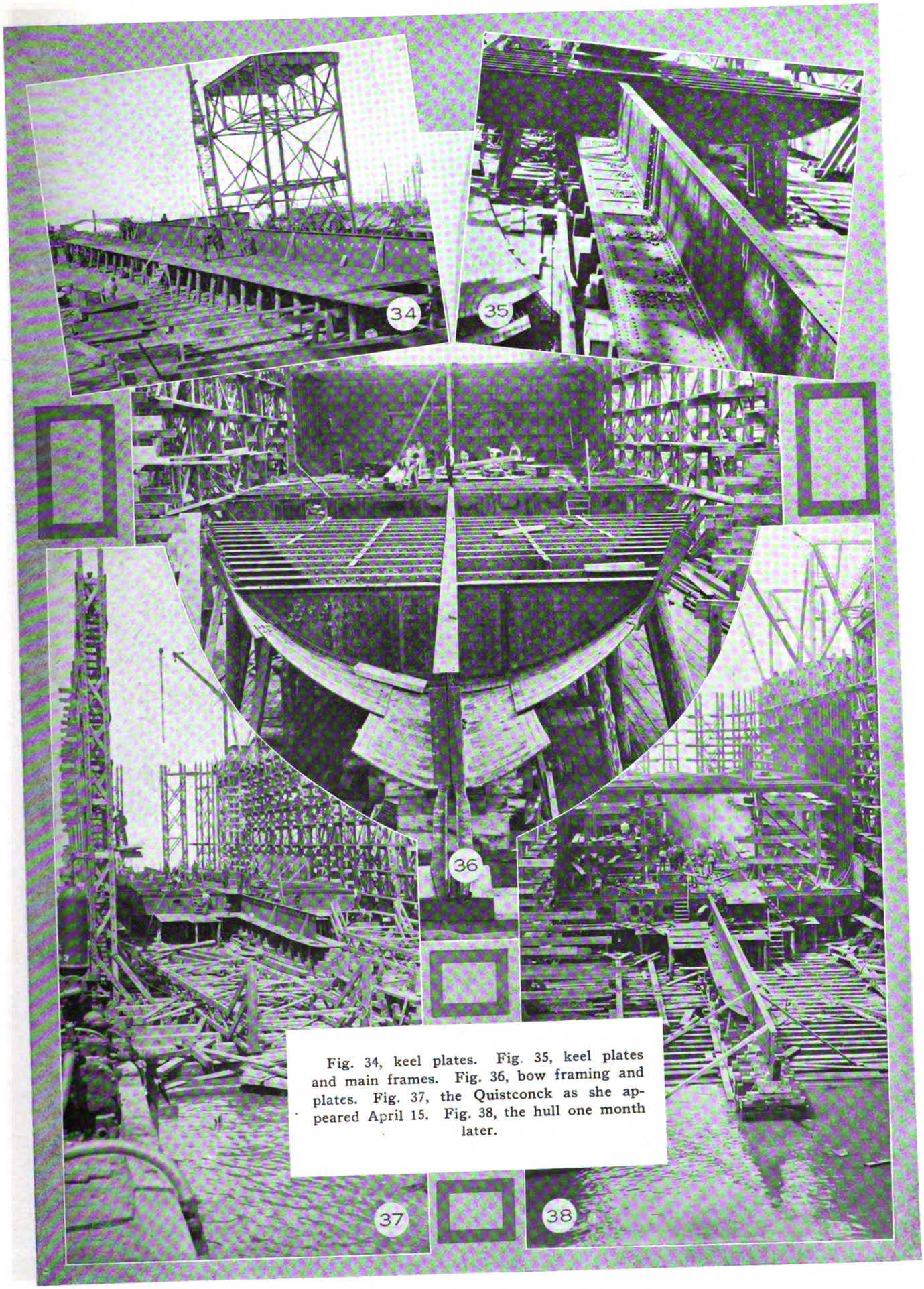

Fig. 34, keel plates. Fig. 35, keel plates and main frames. Fig. 36, bow framing and plates. Fig. 37, the Quistconck as she appeared April 15. Fig. 38, the hull one month later.

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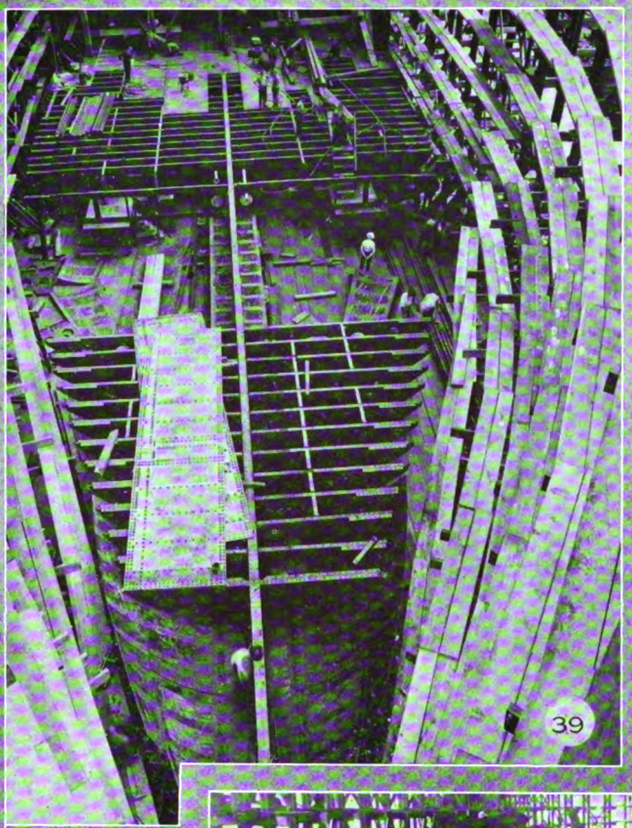
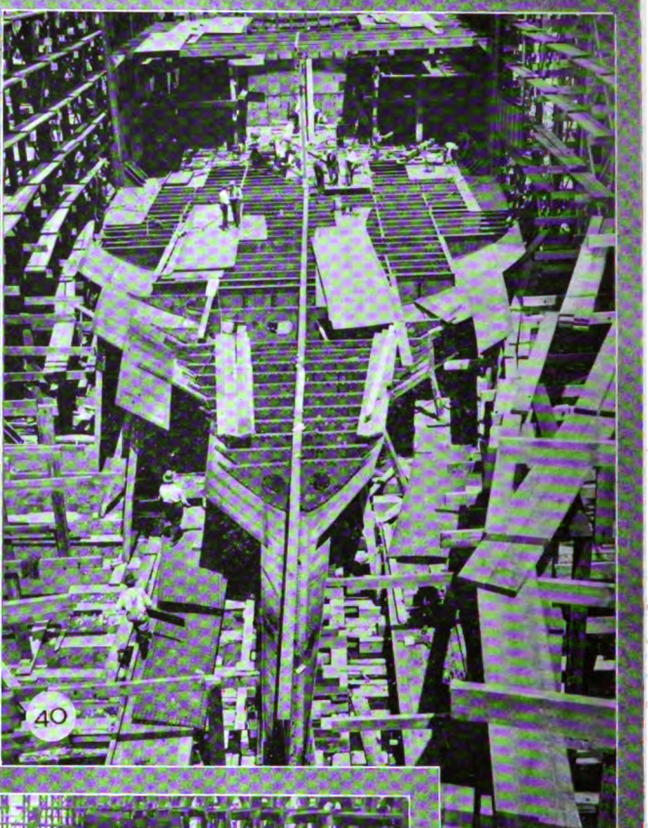




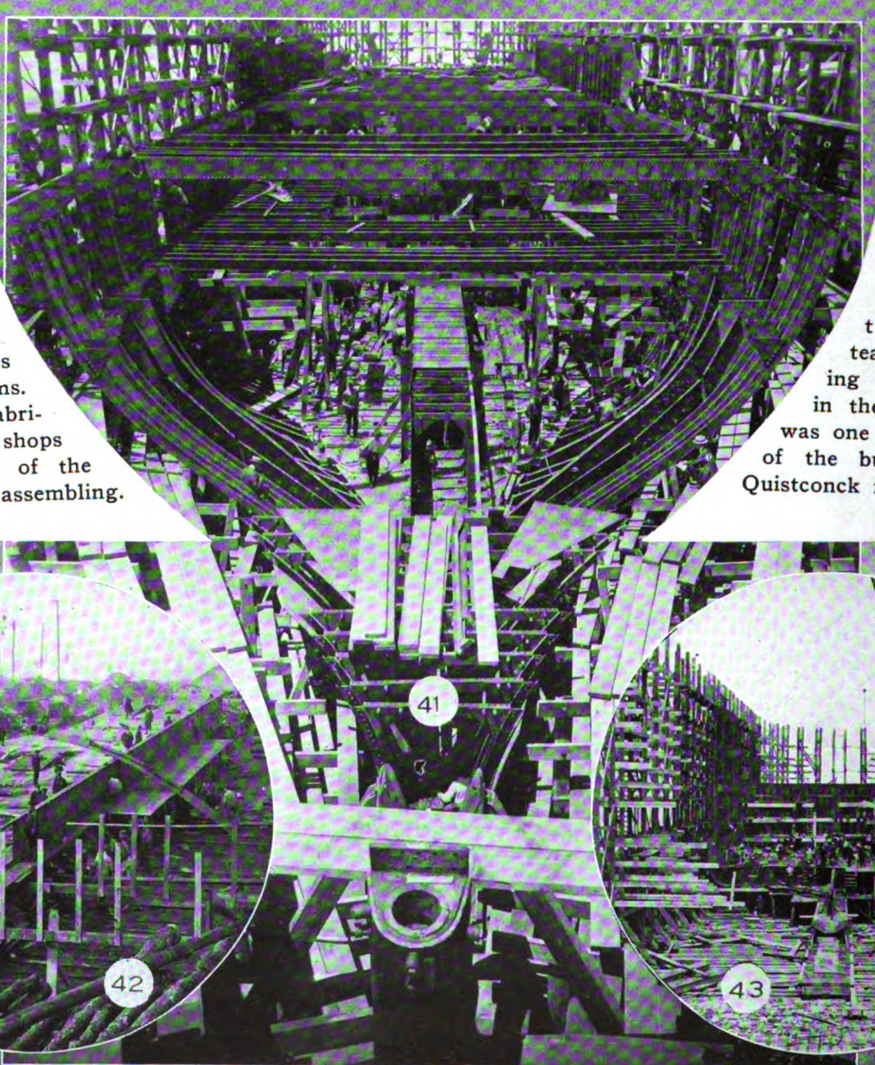
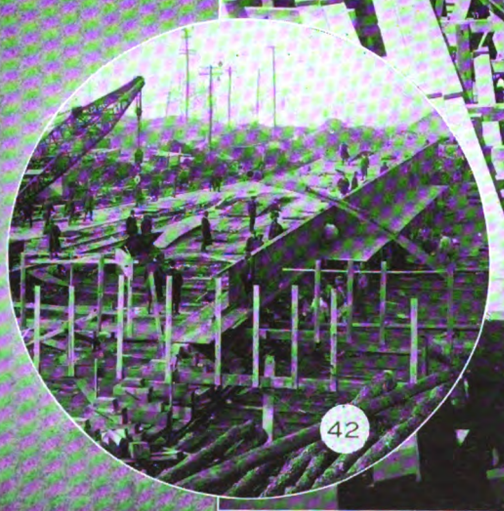
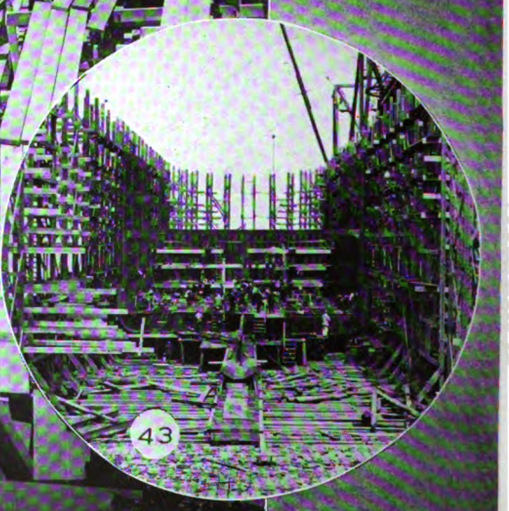


Fig. 39, looking down at hull from top of bow staging. Fig. 40, stern staging. Fig. 41 detail of ribs and deck beams. To perfect fabrication in many shops was due much of the great speed in assembling.

Figs. 42 and 43, keel and frame construction. Rivalry between various teams in performing the best work in the shortest time was one of the features of the building of the Quistconck from the start.





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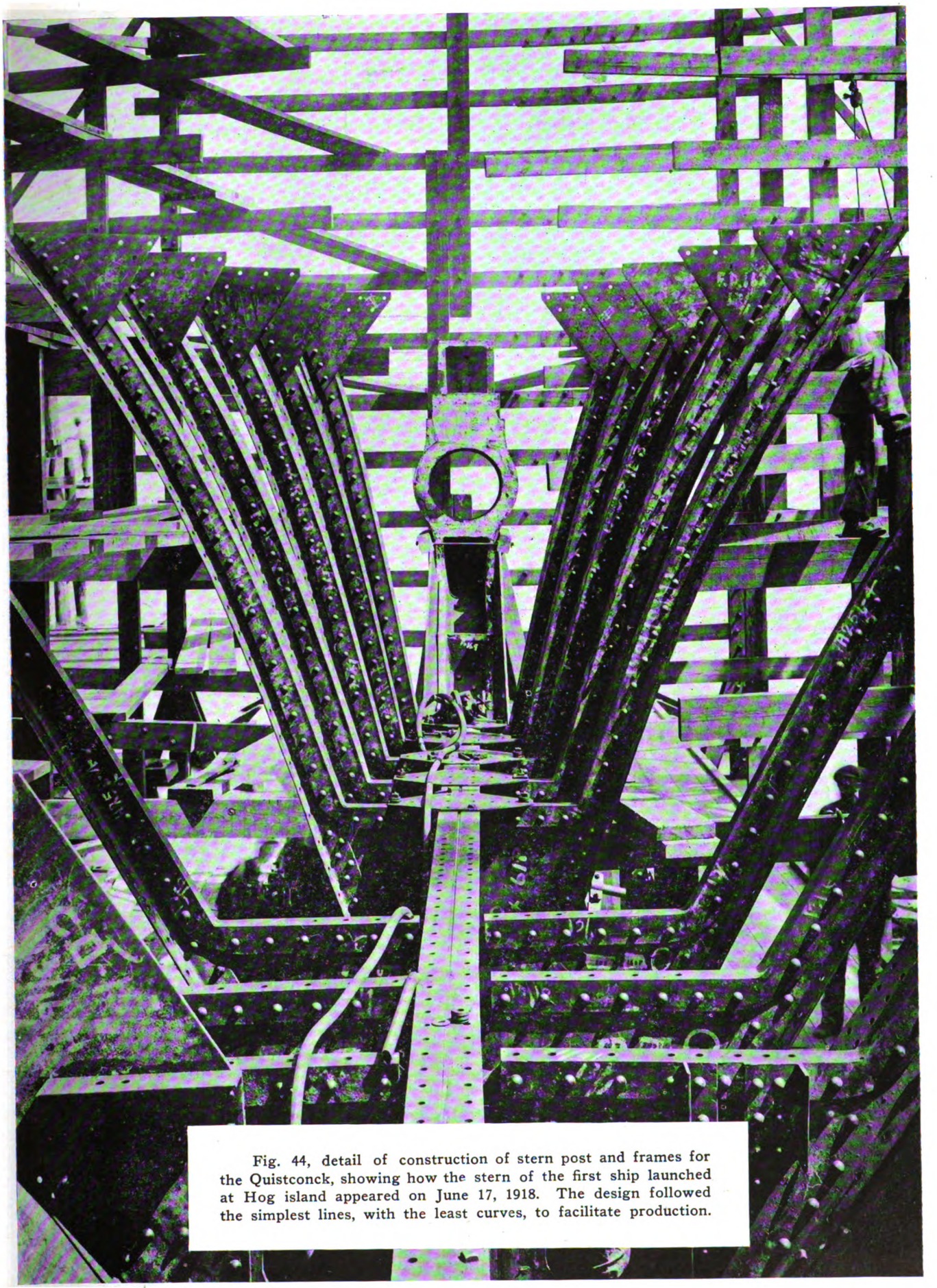

Fig. 44, detail of construction of stern post and frames for the Quistconck, showing how the stern of the first ship launched at Hog island appeared on June 17, 1918. The design followed the simplest lines, with the least curves, to facilitate production.

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Fig. 45, record pile driving crew, 165 piles having been driven in 9¼ hours or 10,259 feet of penetration attained with 5000-pound hammer. Fig. 46, caulking seam, inner bottom plates. Fig. 47, lifting bilge plate into position. Fig. 48, cutting out rivets that fail to pass inspection, with oxygen torch. Rivalry has always been keen among various teams of workers at Hog Island, the friendly kind of rivalry making for the utmost speed and quality in production.

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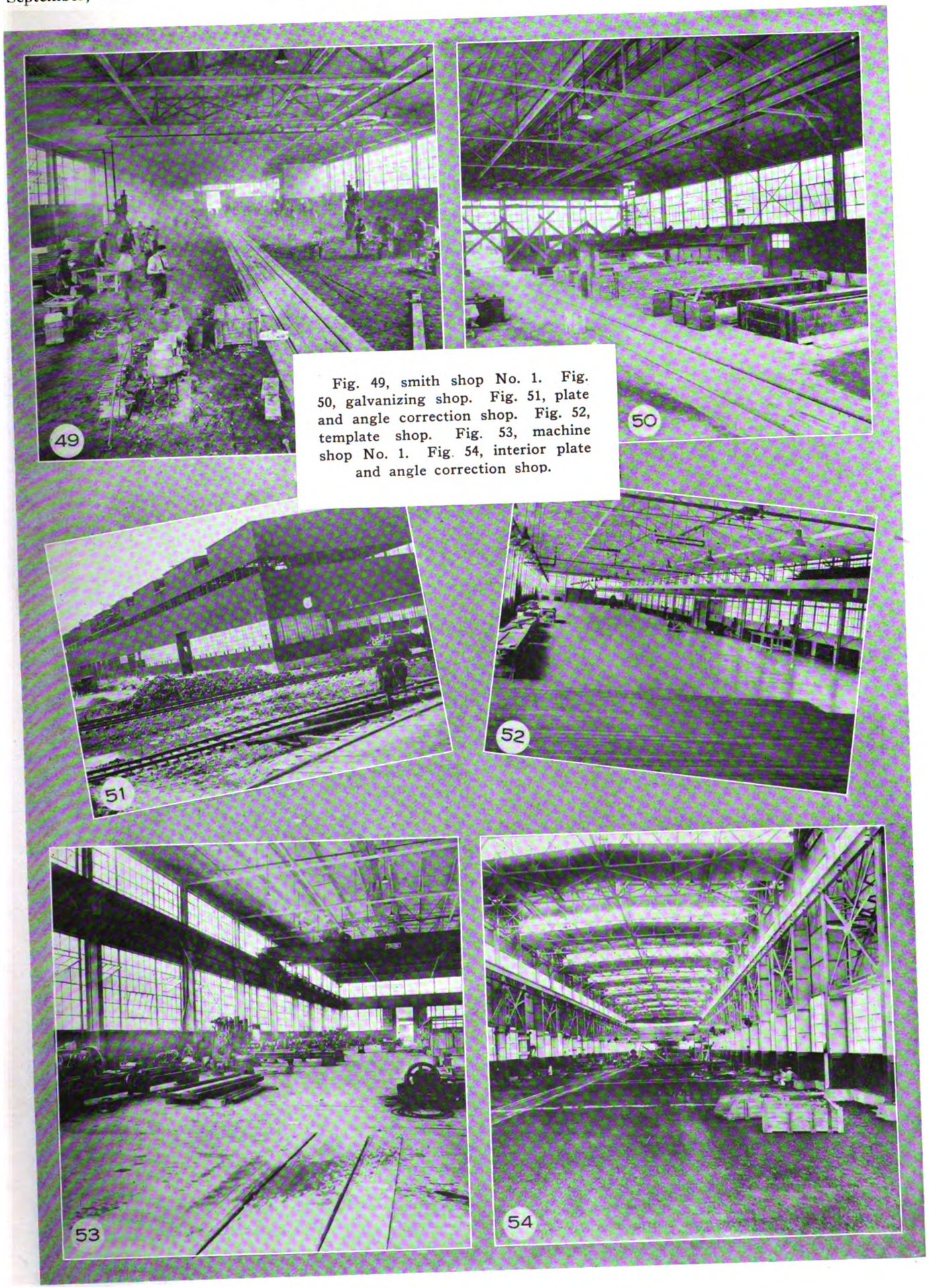

Fig. 49, smith shop No. 1. Fig. 50, galvanizing shop. Fig. 51, plate and angle correction shop. Fig. 52, template shop. Fig. 53, machine shop No. 1. Fig. 54, interior plate and angle correction shop.

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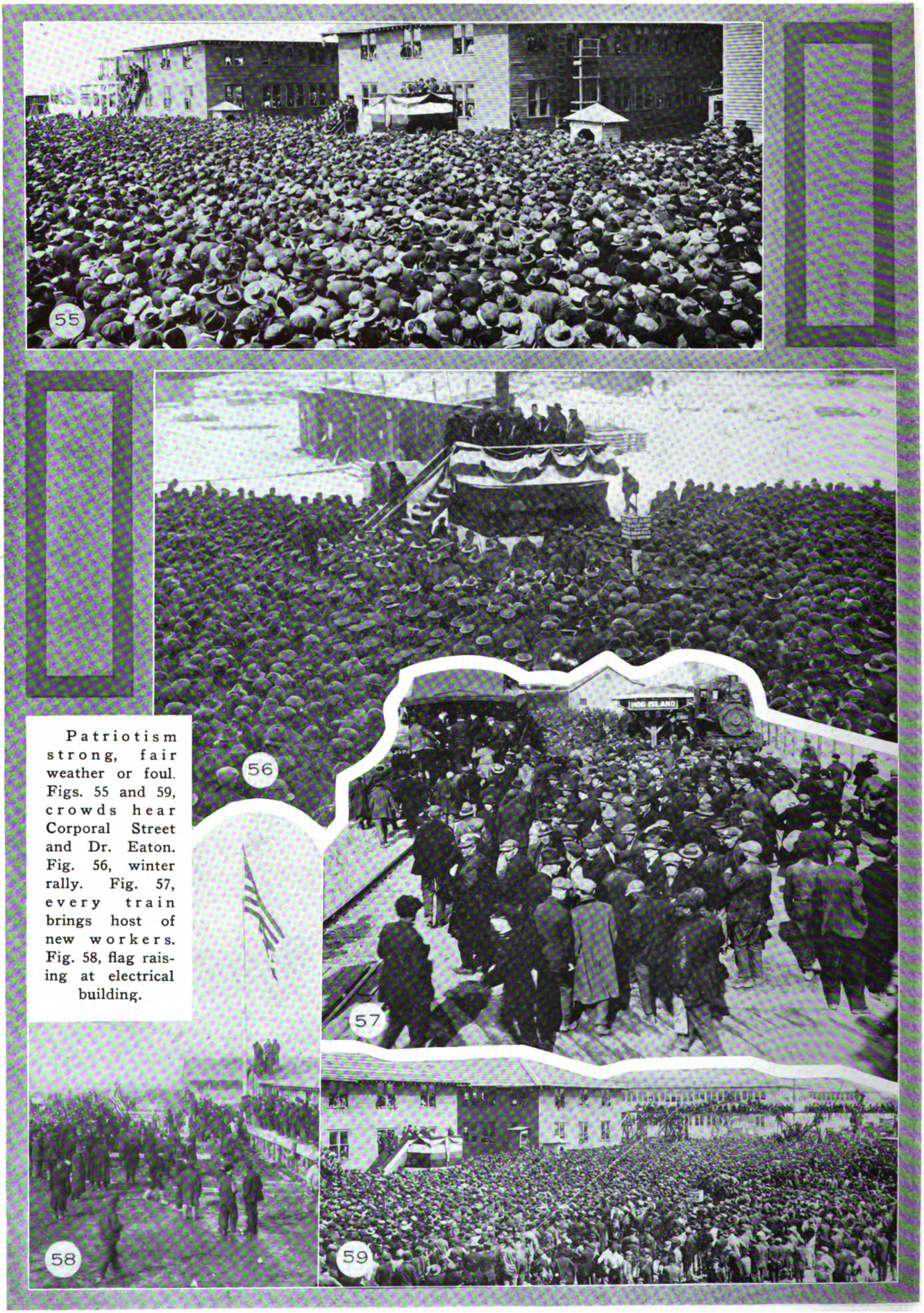

Patriotism strong, fair weather or foul. Figs. 55 and 59, crowds hear Corporal Street and Dr. Eaton. Fig. 56, winter rally. Fig. 57, every train brings host of new workers. Fig. 58, flag raising at electrical building.

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Fig. 60, girls operate telephone system. One thousand girls and women are employed in various occupations in this shipyard city. Fig. 61, first aid room. Fig. 62, hospital ward. Fig. 63, guards at drill.

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Fig. 64, mess hall. Fig. 65, kitchen. Thousands of employes are served daily. Fig. 66, motor truck delivers cool drinking water to men in yards. Fig. 67, noontime at canteen, workers read weekly newspaper printed at yards.

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Hog Island Yard Draws Material From Many Sources

In building ships, the American International Shipbuilding Corp. at Hog Island employs the products of more than 3500 firms in all parts of the country. Space limitations preclude the publication of the complete list. The following are the names of contractors, fabricators, and manufacturers of ship propulsion equipment and miscellaneous ship supplies and fittings.

Contractors on Yard Construction

Cummings Structural Concrete Co., Pittsburgh
Delaware Dredging Co., Philadelphia
Holland & Co., New York City
MacArthur Concrete Pile & Foundation Co., New York City
Manwaring & Cummings, Philadelphia
Ulen Contracting Co., New York City
Cleveland Pneumatic Tool Co., Cleveland
Chas. K. Cook Co., Camden, N. J.
Globe Automatic Sprinkler Co., Philadelphia.
Street Bros. Machine Works, Chattanooga, Tenn.
Norbom Engineering Co., Philadelphia.
Ingersoll-Rand Co., New York City
Snare & Triest Co., New York City
Raymond Concrete Pile Co., New York City
Jarrett-Chambers Co., New York City
Hugh Nawn Contracting Co., Roxbury, Mass.
Arthur McCullen Co., New York City
American Dredging Co., Philadelphia
American Hoist & Derrick Co., St. Paul
Bates & Rogers Construction Co., Chicago
M. W. Kellogg Co., New York City
Industrial Works, Bay City, Mich.
McMyler Interstate Co., Bedford, O.

Fabricators for Hull Construction

Reeves Bros. Co., Alliance, O.
Joseph T. Ryerson & Son, Chicago
R. D. Wood & Co., Philadelphia
Carroll Porter Boiler & Tank Co., Wellsville, O.
Bellefontaine Bridge Co., Bellefontaine, O.
Wm. Bros Boiler & Mfg. Co., Minneapolis
Dominion Bridge Co., Toronto, Canada.
Penn Bridge Co., Beaver Falls, Pa.
Standard Iron Works, New York City
Lehigh Structural Steel Co., Allentown, Pa.
Crown Iron Works, Minneapolis
St. Paul Foundry Co., St. Paul
Petroleum Iron Works, Sharon, Pa.
John Eichleay Jr. Co., Pittsburgh
McClintic Marshall Co., Pittsburgh
Kansas City Structural Steel Co., Kansas City, Mo.
Cambria Steel Co., Johnstown, Pa.
Joliet Bridge & Iron Co., Joliet, Ill.
Chicago Bridge & Iron Co., Chicago
Hamilton Bridge Works, Hamilton, Canada
Hedden Iron Construction Co., West Elizabeth, N. J.
Gem City Boiler Co., Dayton, O.
Belmont Iron Works, Philadelphia
Lewis F. Shoemaker & Co., Philadelphia
Whitehead & Kales Iron Works, Detroit
Standard Boiler & Plate Iron Co., Niles, O.
Oregonia Bridge Co., Lebanon, O.
Alexandria Iron Works, Washington
Canton Bridge Co., Canton, O.
Dayton Steel Construction Co., Dayton, O.
Mt. Vernon Bridge Co., Mt. Vernon, O.
Alliance Structural Steel Co., Alliance, O.
Bethlehem Steel Co., South Bethlehem, Pa.
New York Shipbuilding Corp., Camden, N. J.
Bethlehem Steel Corp., Bridge Dept., Steelton, Pa.
Pennsylvania Engineering Works, New Castle, Pa.
King Bridge Co., Cleveland
Richmond & Kemp, Philadelphia
East Iron & Machine Co., Lima, O.
David Lupton's Sons Co., Philadelphia
Warren City Tank & Boiler Co., Warren, O.
Birdsboro Foundry & Machine Co., Birdsboro, Pa.
Camden Iron Works, Camden, N. J.
J. J. Davies & Co., Philadelphia
Hale & Kilbourne Corp., Philadelphia
Stupp Bros. Bridge & Iron Co., St. Louis
Hubbard Steel Foundry Co., E. Chicago, Ind.
Blaw-Knox Co., Pittsburgh
The Brownell Co., Dayton, O.
McGregor McIntyre Co., Toronto, Canada
Columbus Structural Steel Columbus, O.
Chandler & Taylor Co., Indianapolis
Phoenix Iron Works Co., Meadville, Pa.
Haskell & Barker Co., Michigan City, Ind.
Hammond Iron Works, Warren, Pa.
Lebanon Boiler Works, Lebanon, Pa.
Stacey Mfg. Co., Cincinnati

Ship Propulsion Equipment

Babcock & Wilcox Co., New York City
Coen Co., San Francisco
Locomotive Feedwater Heater Co., New York City
Power Specialty Co., New York City
General Electric Co., Schenectady, N. Y.
Wheeler Condenser & Engineering Co., Carteret, N. J.
Worthington Pump & Machinery Corp., New York City
H. G. Trout Co., Buffalo
Crane Co., Chicago
Mesta Machine Works, Pittsburgh
Edna Brass Mfg. Co., Cincinnati
Kennedy Valve Mfg. Co., Elmira, N. Y.
Chattanooga Roofing & Foundry Co., Chattanooga, Tenn.
Mason Regulator Co., Boston
Industrial Requirements Co., Philadelphia
Uhler & English, Philadelphia
Penberthy Injector Co., Detroit
J. E. Lonergan Co., Philadelphia
Strong, Carlisle & Hammond Co., Cleveland
Riverside Boiler Works, Cambridgeport, Mass.
American Clay Machinery Co., Willoughby, O.

Ship Supplies and Fittings

Hyde Windlass Co., Bath, Me.
Brunswick Refrigerating Co., New Brunswick, N. J.
American Bitumastic Co., New York
Pittsburgh Screw & Bolt Co., Pittsburgh
Champion Rivet Co., Cleveland
James McKay Co., Pittsburgh
Baldt Anchor Co., Chester, Pa.
Plymouth Cordage Works, Plymouth, Mass.
Youngstown Sheet & Tube Co., Youngstown, O.
Merritt Mfg. Co., Lockport, N. Y.
American Engineering Co., Philadelphia
American District Steam Co., North Tonawanda, N. Y.
Flour City Ornamental Iron Works, Minneapolis
Steward Davit & Engine Co., Hudson, N. Y.
Ford & Kendig, Philadelphia
Welin Marine Equipment Co., Long Island City, N. Y.
Treadwell Engineering Co., Easton, Pa.
J. C. Vanderslice Co., Camden, N. J.
Pennsylvania Iron Works, Eddystone, Pa.
Wm. Wharton Jr., Co., Philadelphia
Humphreys Mfg. Co., Mansfield, O.
Goodall Rubber Co., Philadelphia
Whelands Co., Chattanooga, Tenn.
Mark Mfg. Co. Evanston, Ill.
David Kanweiler's Sons, New York
Scranton Bolt & Nut Co., Scranton, Pa.
Union Hardware Co., Torrington, Conn.
Smyser Royer Co., Philadelphia

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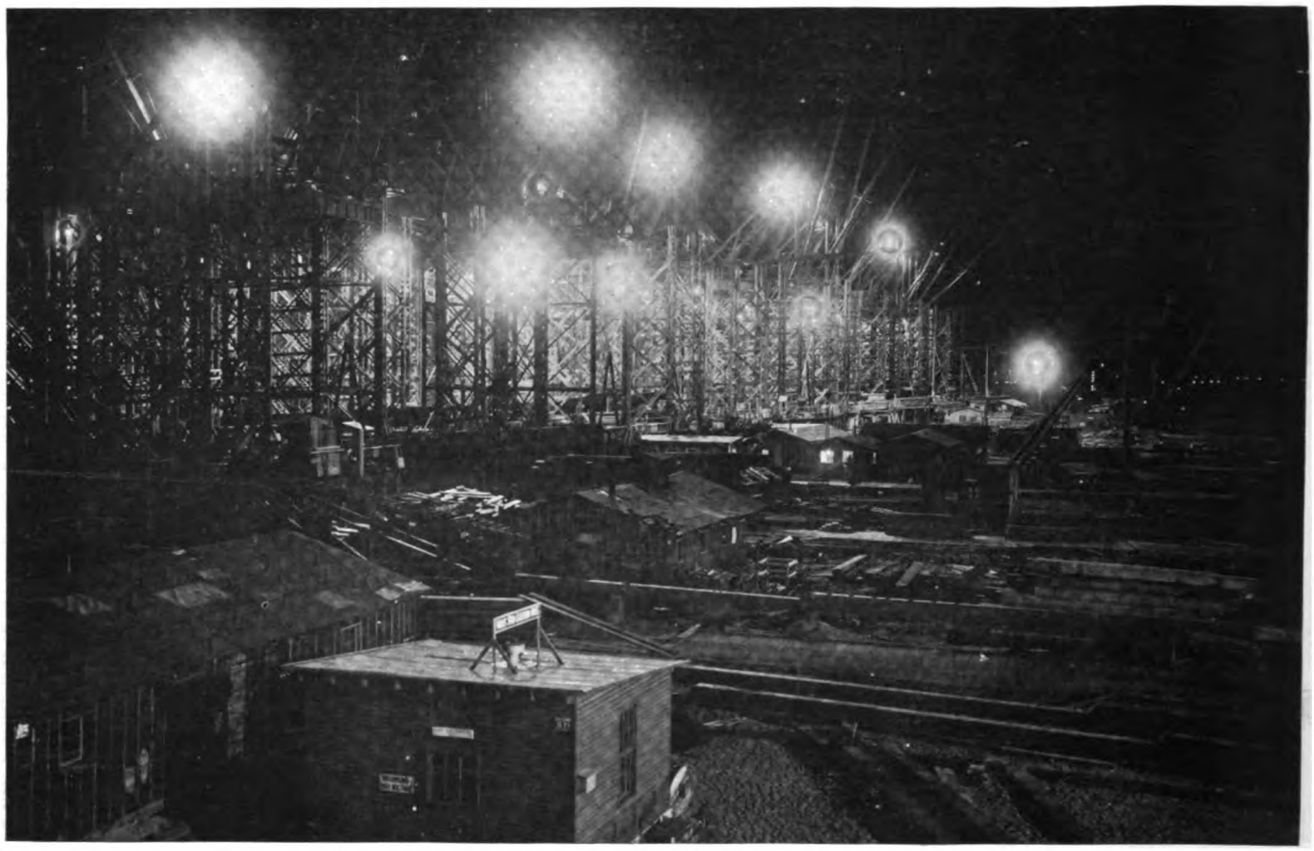
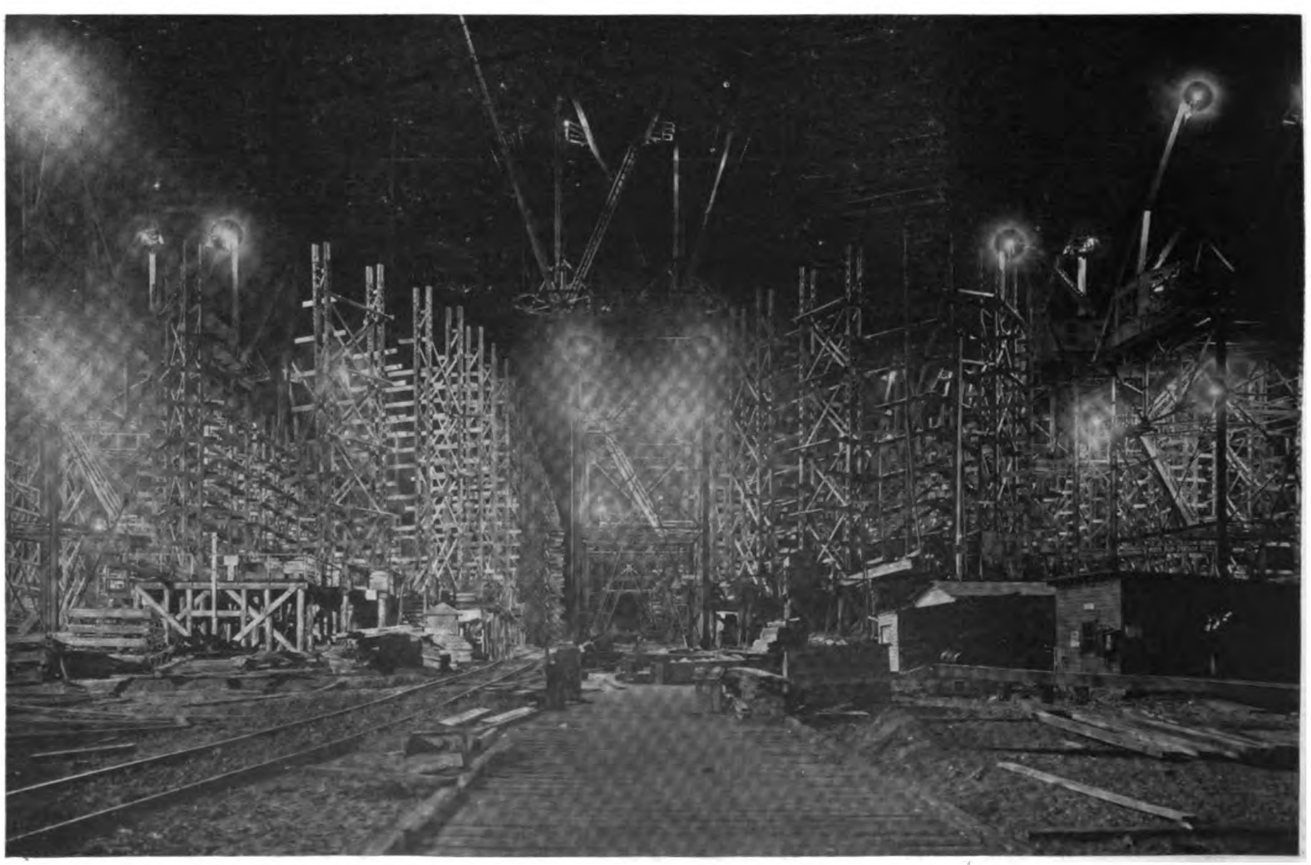
Night at World's Largest Shipyard





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Lake Strike is Averted

Shipping Board Officials at Conference Succeed in Having Strike Order Rescinded—Board's Review of Situation

As a result of a conference between the United States shipping board and union representatives held late in July, the threatened strike on the Great Lakes was called off. Union representatives had advanced certain claims regarding the training of seamen on lake vessels, and also concerning various phases of the welfare plan of the Lake Carriers' association.

The shipping board has arranged to take up the training of sailors on lake vessels. For some time lake vessels have been actively employed by the navy department which, months ago, decided to utilize the splendid training facilities offered by lake vessel owners.

The shipping board vigorously opposed the calling of a strike and gave out the following review of conditions on the lakes:

The attention of the shipping board has been called to a joint strike resolution which has been voted upon by members of the sailors' union of the Great Lakes and of the marine firemen, oilers, and watertenders' union. The resolution calls for a strike effective July 29, 1918, against the Lake Carriers' association, which transports the bulk of the iron ore, wheat, and coal on the Great Lakes. The shipping board issues this statement because the resolution is so worded as to make the board indirectly a party to the controversy.

Reasons Given for Strike

The first reason given in the resolution for striking is to compel the Lake Carriers' association to cooperate with the government in the training and recruiting of seamen on the lakes. The board has not decided to use the Great Lakes for training and recruiting mariners, as it has used the coast, but has left that field largely to the United States navy. It is the understanding of the board that the Lake Carriers' association has fully co-operated in the training of men with the naval auxiliary reserve. However patriotically conceived this part of the resolution may be, it can not constitute a ground for a strike.

The second ground in the resolution is that the Lake Carriers' association refused to attend the national marine conference in May, 1918. This statement is true. Shipping interests and representatives of marine labor from all over the nation attended the national marine conference in May, at the invitation of the board to discuss ways and means of bettering water transportation through the co-operation of employer and employes. The Lake Carriers declined to attend on the ground that such attendance would be a recognition that organized labor represented their employes, which they denied, and accordingly met the shipping board in separate conference. For a number of years the Lake Carriers' association has not dealt with representatives of organized labor on their vessels. The shipping board regrets the attitude of the Lake Carriers in this respect; but in view of the national labor policy promulgated by the President's proclamation of April 8, 1918, it did not feel that it would be justified in forcing the Lake Carriers to meet with representatives of the unions.

Welfare Plan Discharge Book

The next point raised in the strike resolution refers to an award of the shipping board relative to the welfare plan discharge book. This issue was referred to the shipping board for decision by both parties on Sept. 28, 1917. At that time the chief objections of the men were to the provision for recording in the book the continuous discharge of the seamen and to the provision permitting the master to enter a personal opinion of the seaman's service. The unions claimed that these features were used to "blacklist" union men. After a thorough investigation the shipping board in November, 1917, issued a decision abolishing the continuous discharge book. With the opening of navigation in the spring the Lake Carriers' association issued new welfare books, omitting the discharge and opinion features. The unions made strenuous objections to the issuance of these books, stating that they were still used to discriminate against union men.

Ruling After Conferences

After repeated conferences the shipping board, through two communications to the Lake Carriers' association, dated June 14 and July 16, respectively, ruled that the welfare books should altogether be abolished. The last decision stated that if a simple certificate of membership were to be issued in place of the welfare book which had been abolished, such certificate "should not be in book form nor accompanied by a container, and should state on its face that it is the property of the man to whom it is issued. The holder of such certificate should not be required at any time to dispose of his certificate or to deposit it, nor should he be required to produce it at the time of hiring." The decision also stated that "it is the intent of this finding that seamen should be employed solely with reference to their fitness for the work, and not with reference to membership in the welfare plan, nor with reference to affiliation with, or activity in, any union. With the foregoing modification in force, the shipping board believes that the welfare plan will not be open to the charge of being an instrument for discrimination against union men."

The Lake Carriers' association has taken steps to comply with the above award.

By these decisions the shipping board considers it has met the reasonable objections of the unions concerning the discharge-book feature of the welfare plan.

The strike resolution also contains certain demands for increases in wages and payment for overtime. As suggested in the resolutions, this question may be left to arbitration by any impartial tribunal agreeable to both sides. In September, 1917, when the question of wages was referred to the shipping board for decision, an order was issued within three days granting in full the scale requested by the unions.

On the question of overtime the board has recently issued a ruling to the effect that there shall be no overtime work on lake carrier vessels. The shipping board will shortly appoint representatives on the principal lake ports to investigate and adjust complaints arising with respect to the overtime ruling, alleged violations of the seamen's act, and generally such difficulties as may arise between seamen and the vessel operators.

Reports Concerning Strike

The shipping board has heard that in the event of a strike against the Lake Carriers' association it is the intention of the union to call out seamen on boats of other lines which afford the union fullest recognition and against whom no demands have been filed. The shipping board does not believe that the leaders of the unions involved contemplate this step, which can have no bearing on their issues with the Lake Carriers' association other than to harrass this government into taking further action favorable to them.

In issuing this statement the shipping board has gone fully into the

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grievances mentioned in the joint strike resolution because of the grave menace to the national safety involved in a strike on the Great Lakes. A stoppage of the movement of the Lake Carrier vessels would cut off the supply of ore needed in the manufacture of plates for shipbuilding and many other essentials of war, and would jeopardize the movement of wheat to our army abroad and to our allies. No strike should be called which might be based upon a misunderstanding of what has happened or which is capable of a different solution. In view of the facts above outlined the shipping board does not feel that there are any grievances of such nature as to justify a strike at this time.

Edward N. Hurley,
Chairman of the U. S. Shipping Board.

July Ore Shipments

Record ore shipments continue to come down from upper lake ports. July 1918 shipments total 10,659,203 tons as compared to 10,241,633 tons in July, 1917, breaking that record by 417,570 tons. As last year's figures established a record never before attained on the lakes it is a record worth beating. Up to that time the fleet had never carried more than 10,000,000 tons in any one month.

By Aug. 1, 1917, 26,376,768 tons of ore had been brought down. This was a decrease of 2,988,956 as compared with the 1916 tonnage of 29,365,724. This year's figure shows an increase of 3,232,165 tons over the 1917 shipments and of 243,209 tons over the 1916 shipments, wiping out the 1916 lead for the first time this year.

The following table shows the July and the season's shipments by ports:

	July, 1918	To Aug. 1, 1918
Escanaba	1,109,511	2,842,877
Marquette	630,341	1,684,019
Ashland	1,337,047	3,373,115
Superior	2,352,679	7,051,244
Duluth	3,636,948	9,913,087
Two Harbors	1,592,677	4,744,591
Total	10,659,203	29,608,933
1918 increase	417,570	3,232,165

To Build Barges and Tugs

The Ferguson Steel & Iron Co., Buffalo, recently was awarded a government contract to build six 1000-ton seagoing tugs. Keels have been laid for two of the vessels. These boats are 150 feet long and are to be propelled by triple expansion, inverted type reciprocating engines of the latest design. The engines will develop 1800 indicated horsepower.

The Ferguson company has another contract to build 24 barges for the New York state barge canal. The barges will be 150 feet long and will not be equipped with engines. The model for the barges was constructed at the Ferguson shops and various changes incorporated after which the design was approved and adopted by the government.

The Ferguson company's main plant on Bailey avenue covers a tract of about 28 acres, which has expanded greatly since the company was organized in 1913. Capt. James E. Ferguson is president of the company. Edward P. Butts is engineer and general manager of the shipyard.

Lake Erie Receipts

Lake Erie ports received 533,864 more tons of ore in July than they did in June as shown by the records of THE MARINE REVIEW. The receipts for July amounted to 8,350,857 gross tons, while those for June were 7,816,993 tons. The July, 1918, figures are also in excess of those of July, 1917, last year's figures only totaling 7,651,882 gross tons.

Ore on dock Aug. 1 aggregated 7,228,721 tons against 5,719,481 tons a year ago.

The detailed receipts for July, 1918, by ports follow:

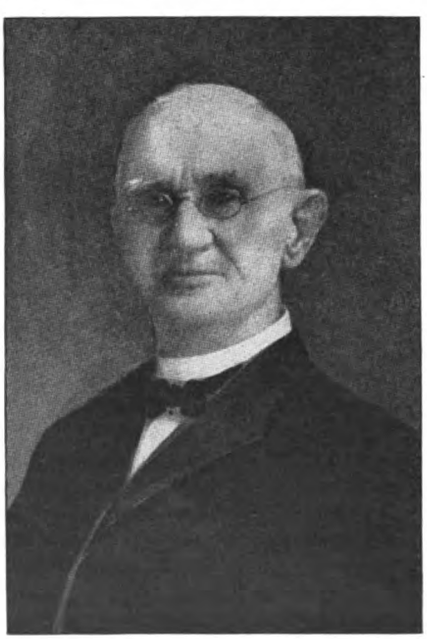
Port	Gross tons
Buffalo	1,513,238
Erie	243,452
Conneaut	1,217,045
Ashtabula	1,875,765
Fairport	354,619
Cleveland	1,740,110
Lorain	636,804
Huron	328,300
Toledo	388,867
Detroit	52,657
Total	8,350,857

Capt. George Perry McKay, 1838-1918

CAPT. GEORGE PERRY McKAY died at his home, 17880 Lake avenue, Cleveland, on Aug. 6. Captain McKay was treasurer of the Lake Carriers' association. He was one of the best known mariners on the Great Lakes, having sailed for years and having been a leader in the development of the commercial importance of the Great Lakes.

Captain McKay was born aboard the steamer COMMODORE PERRY, Jan. 13, 1838, while the vessel was lying in Swan creek, Maumee river. His seafaring career began while he was but a lad. He first sailed with his father, Capt. John McKay on the schooner ALGONQUIN. He continued to sail in vessels commanded by his father and he made steady progress in seamanship and navigation. Before he was 21 years old he was considered a skilled navigator. In 1858, when 20 years old, he was made first mate of the steamer IRON CITY, which berth he held for two years.

With the opening of navigation in the spring of 1861, Captain McKay was given command of the steamer GENERAL TAYLOR which command he held until 1862, when he took charge of the MINERAL ROCK. He commanded this vessel for a year and left her to command the PEWABIC which he commanded until she was sunk in a collision in Thunder bay with the steamer METEOR in August, 1865.



CAPT. G. P. McKAY

In 1873 Captain McKay entered the employ of M. A. Hanna & Co., which had just organized the Cleveland Transportation Co. At that time the company was building the steamers GENEVA and GENOA. These vessels were launched in 1873 and Captain McKay was given command of the GENEVA. In 1882 Captain McKay retired from service on the lakes to accept a position as general manager of the Transportation company's fleet.

Captain McKay was elected secretary and treasurer of the Cleveland Vessel Owners' association in 1882 and continued in that capacity until the Lake Carriers' association was formed. He was treasurer of the Lake Carriers' association from the time of its organization until his death. For many years he was chairman of the Lake Carriers' committee on aids to navigation.

Captain McKay married Miss Ann Swaffield at Cleveland in 1858. Mrs. McKay died a number of years ago. Captain McKay is survived by a daughter and a grandchild.

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Marine News in a Personal Way

Intimate Gossip About What Leaders in the Maritime World Are Doing

WILLIAM M. BAILEY has joined the organization of the Federal Shipbuilding Co., Kearney, N. J., the shipbuilding subsidiary of the Steel corporation. Mr. Bailey for many years was closely identified with the executive management of large steel companies. For years he served as secretary to President A. C. Dinkey of the Carnegie Steel Co. and later in the same capacity when the latter went with the Midvale Steel & Ordnance Co. When Mr. Bailey left the Midvale Steel & Ordnance Co. he was filling the post of assistant to the president. His connection with the Federal Shipbuilding Co., therefore, represents his return to the Steel corporation. Mr. Bailey is one of the type of younger iron and steel men of the highly capable class who are associating themselves with the rejuvenated shipbuilding industry.

* * *

J. HARRY MULL has been elected president of the William Cramp & Sons Ship & Engine Building Co., Philadelphia, to suceed HARRY W. HAND. Other officers re-elected are: H. BIRCHARD TAYLOR, vice president; CHARLES T. TAYLOR, secretary and treasurer; ROLAND L. HOWE, assistant secretary; CLARENCE R. PETERSON, assistant treasurer, and GEORGE D. MARTIN, comptroller.

* * *

H. E. STOCKER, production manager of the Fort Wayne works of the General Electric Co., has tendered his resignation and will become general manager of the International Clay Machinery Co., Dayton, O. He will be succeeded at Fort Wayne by J. H. EVANS, present head of the cost and accounting department of the General Electric Co.'s plant in that city.

* * *

M. C. TUTTLE, former manager of the production division of the Emergency Fleet corporation, has been placed at the head of the recently created supply division. This department is organized to supply material to the various shipyards and centralizes the duties of the purchasing, production and transportation divisions.

* * *

DWIGHT P. ROBINSON and JOHN W. HALLOWELL retired July 1 from partnership in the engineering and corporation management firm of Stone & Webster, New York. The remaining partners are CHARLES A. STONE, president of the American International Corp.; EDWIN S. WEBSTER, RUSSELL ROBB and HENRY G. BRADLEE. Mr. Robinson was president of the Stone & Webster Engineering Corp. since 1908, and in the spring of 1917, when the American International Shipbuilding Corp. was formed as a subsidiary of the American International, to build and operate the government fabricating shipyard at Hog Island, he was elected president of that corporation, but last March he was removed from charge of the work by Rear Admiral Bowles, assistant general manager of the Emergency Fleet corporation, who is in direct charge of the Hog Island yard on behalf of the government. Mr. Hallowell has been with Stone & Webster since 1901, and in 1917 he was called to Washington by Herbert C. Hoover as a member of the United States food administration, and expects to continue in that service for the duration of the war.

* * *

R. W. LEATHERBEE, who has been attached to the office of Vice President Piez of the shipping board, is appointed general supervisor of the district representatives of the industrial relations group. Mr. Leatherbee will have charge of all district activities relating to industrial enterprises.

* * *

F. W. BALLARD, Cleveland consulting engineer, and who was the city's expert in the building of the municipal light plant, now is special assistant to the vice president of the Emergency Fleet corporation. Word of his appointment was received recently from Washington. His office, it is said, will be in Philadelphia, headquarters of the corporation.

* * *

W. J. BROWN has been made New York representative of the Bethlehem Steel Bridge Co. and the Bethlehem Shipbuilding Corp., Delaware corporations. His headquarters are 111 Broadway.

* * *

HENRY DEBARDELEBEN, Birmingham, Ala., has been named manager of the Warrior river, Ala., section of the Mississippi-Warrior waterways improvement and barge line service, according to announcement by M. J. Sanders, federal manager of barge lines for the government. THEODORE BRENT, formerly manager of the traffic bureau of the New Orleans association of commerce, has been made traffic manager of the barge lines. Building of steel barges for use under federal supervision and with federal aid on these rivers will be begun within 60 days from the end of July, Mr. Sanders declared.

* * *

J. A. LAIRD, Sabine, Tex., has been appointed manager of the government's assembling plant for the sixth district, at Beaumont, Tex. The plant will have a storage capacity of 20,000,000 feet of shipbuilding timbers. All classes of material for use in shipbuilding will be concentrated there and distributed to yards in the district, from Rockport, Tex., to Morgan City, La. A 2-story office building and practically all the switch tracks have been completed for the assembling plant.

* * *

R. H. DOWNMAN, New Orleans, director of lumber for the war industries board, has resigned and CHARLES EDGAR, Essex Falls, N. J., formerly acting chief of the lumber section, has been named in his place.

* * *

ARTHUR MASTERS has been appointed general manager of the Foundation Co., Savannah, Ga., to succeed L. D. JOHNSON.

* * *

WALTER B. POLLOCK has been appointed by the United States shipping board a member of the board of arbitration, New York harbor wage adjustment, to represent the railroad companies in New York harbor. As deputy marine director he has supervision of all of the floating equipment for the eastern railroads in New York harbor.

* * *

ARTHUR LOEB, a famous deep-sea diver, will be sent by the American government to French waters to assist in locating sunken vessels.

* * *

ROBERT S. MOORE, who can be called the man who put Oakland, Cal., on the shipbuilding map, and who for several years has been president of the Moore Shipbuilding Co., Oakland, has retired from active presidency to become chairman of the board of directors, giving place to GEORGE A. ARMES.

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What the Government is Doing

Rulings on Marine Matters **Improvements to Waterways**

Hints to Navigators

China to Build Twelve Ships for U. S.

CHAIRMAN E. N. HURLEY of the shipping board has let a contract for the construction of 120,000 tons of steel ships in the Chinese government yards at Shanghai.

Washington officials regard this move as a good business and diplomatic stroke and an important factor in cementing and utilizing the strength that is arrayed against Prussian autocracy.

China has for many years found her best friend in the United States and is an ally of this nation and the others at war with Germany. Thus far, only her moral support has been given to the allies, but she has been anxious to play a useful part in the war and especially on behalf of the United States.

Chairman Hurley, in his world-wide census of shipbuilding facilities which could be turned to account in building ships for the allies faster than the German submarines could destroy them, found a large modern shipbuilding plant at Shanghai, owned and operated by the Chinese government, but near to idleness because the war had practically cut off the supply of iron and steel to China.

The plant is known as the Kiangnan Dock & Engineering Works, and includes the Chinese government naval dock. The entire works are wholly owned by Chinese interests, and were established in 1868. A foreign technical staff of shipbuilders, most of them from Scotland, under the direction of R. B. Mauchan, is in charge.

Has Twelve Launching Ways

There are 12 launching ways in the yard, each one capable of turning out large steel ships of the most modern type. The shops are fully equipped with modern machine tools, capable of producing marine engines and all ship accessories. The works has turned out more than 300 ships all completed in the one plant. There is a large drydock capable of docking ships up to 544 feet in length.

Chairman Hurley was anxious to keep this plant in operation at full strength for the benefit of the allies. The first work of the war given to the plant was the rehabilitation of the German and Austrian vessels interned in China. These were made seaworthy and turned over to the United States, England, France and Italy as a part of China's contribution to the war.

Before this work was completed Chairman Hurley had negotiations under way by which ships could be built at Shanghai for the United States. He met a most hearty response from officials on behalf of the Chinese government.

Mr. Mauchan came to Washington recently and signed contracts by which, as a first order, 12 modern vessels of the cargo type will be built for the account of the shipping board. The program for construction of vessels, as now framed, calls for the expenditure of about $30,000,000.

Delivery of the first vessels will be made in about six months and would be made much sooner but for the unavoidable delay in furnishing steel and iron from this country.

As soon as the material is on hand in quantity the shipbuilders will put thousands of men to work and rush the work night and day until the vessels are completed.

Exportation of Ship Plans Forbidden

An order issued recently by Secretary McAdoo instructing customs collectors to refuse permits to all except government officials for taking ship and shipyard plans out of the country, revealed that agents of the shipping board recently seized in New York a large number of specifications on ships clearing for Scandinavian ports.

Some of them were the property of American builders, who explained that they had been asked for plans as a basis for postwar orders. Investigation is being made of the purpose for which the other shipments were intended.

Military interests of the United States were considered to be jeopardized by the marine documents which were taken from passengers and members of the steamers' crews. The documents are said to have included detailed drawings of American shipyards, photographs of ways, plans, and ships, blueprints of American steamships, sailing vessels, and mine sweepers, and specifications of ships being built for France.

Explanation of the attempted sending of the documents abroad has been asked of several builders in view of the shipping board's announced policy in opposition to the solicitation of after-war orders from neutral countries at this time when the American building program must have the undivided attention of all ship workers if the war is to be won.

Secretary McAdoo's order forbids the exportation of shipbuilding information except under permit from the Emergency Fleet corporation, and the secretary has been asked to order the confiscation of all such plans found in the possession of unauthorized persons leaving the country.

More Navigation Schools

In Pratt Institute, Brooklyn, N. Y., the United States shipping board recruiting service opened its eleventh free marine engineering school and its forty-fourth free navigation school for the training of experienced men as engineer and deck officers in the merchant marine on Wednesday evening, July 22.

In the last 12 months the shipping board has conducted a series of these schools from the Atlantic to the Pacific and from the Great Lakes to the Gulf. Hundreds of graduates are now doing war service in the merchant marine on ships carrying supplies coastwise and overseas.

The schools are not for landsmen. Men experienced in seafaring or engineering are eligible to enter these free schools, if they are Amrican citizens over 19. The first aim of the shipping board's free schools is to help a man get his first license, and thus establish him as a licensed officer in the merchant marine; but the schools are also open to licensed men who wish to brush up on their navigation or me-

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chanical knowledge as a step toward an advance in grade. Men trained in these schools will not be called for military service while in the merchant marine. Application for enrollment may be made at the schools, or direct to headquarters of the shipping board recruiting service, Custom House, Boston, Mass.

Need Officers for U. S. Submarines

The submarine force of the United States navy needs men to serve as officers. A call has been issued urging men who are qualified, to apply.

Applicants must have had technical training in mechanical or electrical engineering. It is intended to enroll a number of such men as provisional ensigns in the naval reserve force. They will be given a course of instruction in deck duties at Annapolis, Md., and a course in submarine work at New London, Conn. Those who complete these courses successfully will be detailed aboard submarines for regular duty.

Men who desire to take up this branch of the naval service should communicate with the Commander of Submarine Force, U. S. S. CHICAGO, care of postmaster, New York City. The following qualifications are required:

Desire to serve in submarines.
Degree of M. E., E. E., or E. M.
Two and a half years practical experience in profession.
Not over 35 years old.
Physically strong and sound.

Candidates should, if practicable, receive the indorsement of one of the following organizations:

Naval Consulting board.
National Research council.
American Society of Mechanical Engineers.
American Institute of Electrical Engineers.
American Institute of Mining Engineers.

Bunker Coal Must be Clean

Twenty-five additional federal coal inspectors have been appointed to see that bunker coal is delivered in a clean state. These inspectors will operate in the fields out of which is shipped coal for the Atlantic ports. They will be charged with the special duty of providing the highest quality of coal for use of ships transporting men and materials through the submarine zone, for which purposes it is desirable that only the best coal be furnished. The slowing up of ships in the submarine zone by reason of poor coal is fraught with the gravest danger and the fuel administration will hold all shippers strictly accountable for the quality of coal shipped to tidewater for bunkering purposes.

The fuel administration has fixed the standard which shippers are required to observe to eliminate dirty coal from the markets and ports. It is expressly provided that no bituminous coal shall be sold, shipped, or distributed if it contains such a quantity of rock, slate, bone, sulphur, fire clay, shale, or such other impurities that it would not have been considered merchantable prior to Jan. 1, 1916.

It is the intention of the fuel administration to make use of every remedy and every agency at its disposal, to guarantee provision of the highest grade of coal for bunkering purposes. Primarily the duty of detecting dirty coal belongs to the inspectors appointed for that purpose, but a more strict surveillance of the output of the mines will be required of the district representatives, under whose jurisdiction the inspectors operate. The shipping of dirty coal, besides retarding the movement of the fleets using it, likewise involves a waste of labor, transportation, and time, all of which must be prevented.

The fuel administration will hold all shippers to a strict observance of the standard established in its order, and if it should transpire that the present regulations are ineffective more drastic measures will be put into effect.

U. S. to Build Barges

A national program of barge construction as an adjunct to the nation's rail transportation system was put under way recently.

At a conference of representatives of the war industries board and other government agencies with Chairman Hurley of the shipping board it was decided that the priorities committee of the war industries board should appoint immediately an expert to decide priorities of material for barge construction. Mr. Hurley said Director General Schwab of the Emergency Fleet corporation would organize a department to build tugs and barges and the war and navy departments and the railroad administration will appoint experts to support the department of barge transportation.

Stone Vessels Meet Present Needs

The United States does not regard the 42 concrete ships for which it has contracted as the first step in the expenditure of a war allotment of $40,000,000 as a permanent investment, according to R. J. Wig, chief engineer of the concrete-ship division of the United States shipping board.

"They are an emergency measure at the best," he said. "They are being built to meet a pressing demand for cargo carriers needed quickly. They are expected to disintegrate. All we are counting upon now is that they will last at least one and probably three years."

Mr. Wig said the shipping board has placed contracts for three concrete vessels of 3500 tons, one of 3000 tons and 38 of 7500 tons deadweight, or 13,000 tons displacement. The latter are to be 420 feet long between perpendiculars, with 4-inch walls, and are to have hold room for 50,000 barrels of oil.

"Structurally, the concrete ship, we believe, will be the equal of any steel ship afloat," Mr. Wig states. "As to weight, the wooden ship is the heaviest afloat. The concrete ship weighs 10 per cent less and the steel ship is lighter by 25 per cent. We are, however, developing aggregates that will considerably lighten the concrete vessel.

"We are frequently asked the question what will happen to the concrete ship if it is torpedoed? The answer is that the concrete ship hit directly by a torpedo will sink. If a concrete ship fails it is no cause for alarm. Some of them may not be successful. We are hoping that one of the benefits of this war will be the development of a concrete ship as nearly perfect as possible. The largest of the ships now building in the five government yards where concrete shipbuilding is under way will carry 2800-horsepower engines."

As to the FAITH, Mr. Wig states that the first American concrete ship stood up well during its initial trip from San Francisco to Vancouver. "She ran into a violent storm, during which the forward deck was covered by from 18 inches to two feet of water almost continuously, and our observers on board were nervous as to the outcome. However, she averaged 10 knots an hour and reached port in good shape without taking an inch of water into the hold." The first concrete ship of modern times was built in Norway and launched August, 1917. It was of 400 tons.

The annual edition of *Green's Marine Directory of the Great Lakes* has been issued recently. As usual, the book contains information regarding lake vessels, giving owners and general dimensions, and other statistical data of interest.

A new shipbuilding concern, capitalized at $5,000,000, has been formed and will operate one of the largest shipyards in America on the shores of the St. Lawrence river, opposite Quebec city. Steel vessels will be built for the French government.

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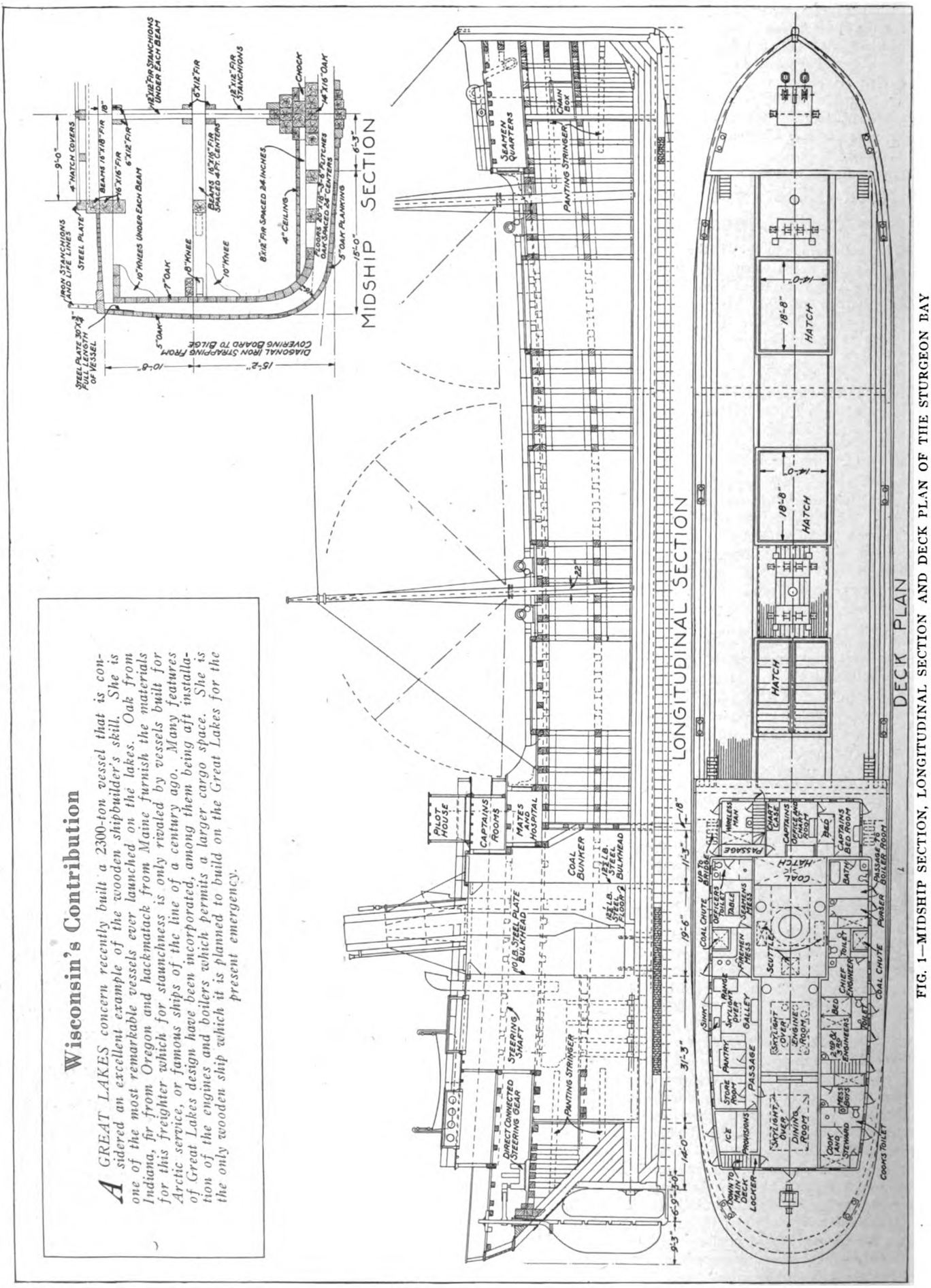

Wisconsin's Contribution

A GREAT LAKES concern recently built a 2300-ton vessel that is considered an excellent example of the wooden shipbuilder's skill. She is one of the most remarkable vessels ever launched on the lakes. Oak from Indiana, fir from Oregon and hackmatack from Maine furnish the materials for this freighter which for staunchness is only rivaled by vessels built for Arctic service, or famous ships of the line of a century ago. Many features of Great Lakes design have been incorporated, among them being aft installation of the engines and boilers which permits a larger cargo space. She is the only wooden ship which it is planned to build on the Great Lakes for the present emergency.

FIG. 1—MIDSHIP SECTION, LONGITUDINAL SECTION AND DECK PLAN OF THE STURGEON BAY

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Oak Steamer Built for U.S. Completed On Great Lakes

By FRED B. JACOBS

Fig. 2—Wooden Steamer STURGEON BAY Ready to Take on Cargo for Her Maiden Voyage

AFTER remaining dormant for many years, wooden shipbuilding on the American side of the Great Lakes was revived with the recent launching for the Emergency Fleet corporation of the STURGEON BAY. This vessel is a cargo carrier designed for overseas service by H. N. Herriman, Cleveland, built by Riebolt, Wolter & Co., Sturgeon Bay, Wis. Built under the direct supervision of W. C. Conwell, representative of the Emergency Fleet corporation, this vessel is a marvel of the wooden shipbuilder's art, for no proud clipper of days long gone could boast of better workmanship than is revealed by an inspection of the STURGEON BAY.

The vessel is 261 feet long overall, 245 feet on the keel, her molded beam is 42 feet and her molded depth 26 feet. Her gross tonnage is 2381, net tonnage 1655. Her planking, ceiling and frames are oak, her deck beams, hold beams and stanchions are fir, her knees are hackmatack and she has galvanized fastenings throughout. An excellent idea of her interior construction is shown in Fig. 3. The general view is from the mainmast while the close-up view is from a point near the forward hatch.

Vessel Is Well Built

As transatlantic cargo carriers are often compelled to make voyages running comparatively light, it is essential in building a wooden vessel for overseas commerce to take advantage of every factor that will insure stability. With this object in view, the keel of the STURGEON BAY is unusually heavy, as the dimensions on the midship section in Fig. 1 show. By referring to Fig. 3, the rigid construction of the keelson is seen. Further to guard the vessel against breaking her back while buffeting the wintery seas of the north Atlantic, a steel cord runs the entire length of the shear. From this cord double diagonal strapping runs down to the bilges. The cord and strapping are mortised into the frames between the frames and planking and are riveted together at crossings.

In the design of the STURGEON BAY, practical features from both ocean and lake vessels have been incorporated. The well deck and comparatively small cargo hatches of the typical ocean freighter have given place to the large hatches and flush deck without bulwarks, as commonly seen on the Great Lakes. This feature is plainly shown in Fig. 6. From the break of the poop to the forecastle deck practically the whole space is given over to hatches, cargo booms and winches.

The deck equipment consists of two masts fitted with 5-ton cargo booms, two on the foremast and four on the mainmast; three double-drum cargo hoists, one at the foremast and two at the mainmast; steam steering gear, with cylinders 7 x 7 inches; a screw hand-

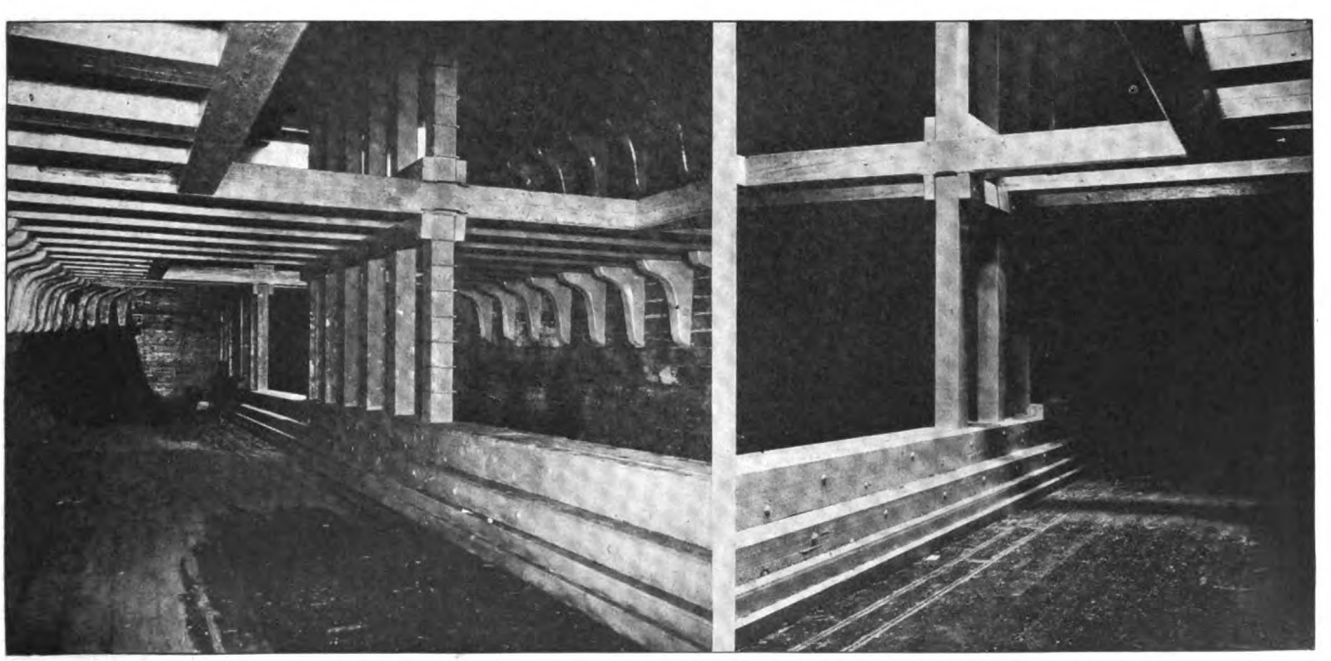

FIG. 3—TWO GLIMPSES OF THE VESSEL'S HOLD WHICH SHOW THE RIGID CONSTRUCTION THROUGHOUT

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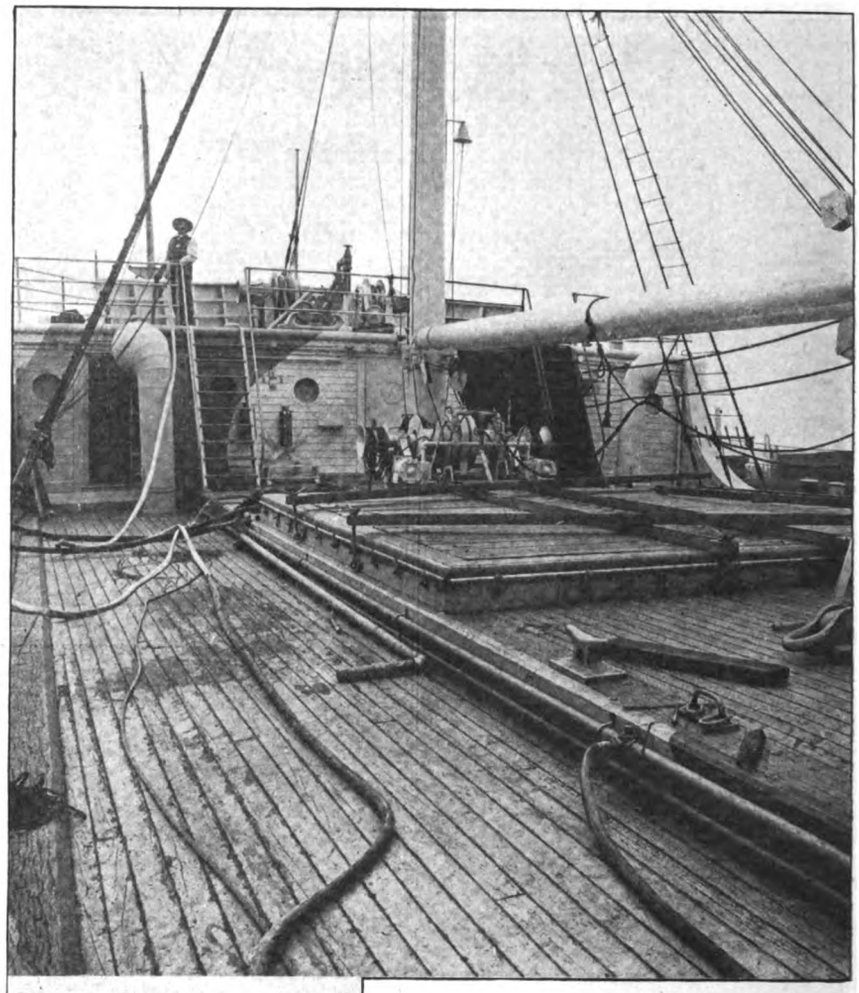

Fig. 4—Looking forward from the main deck. This view shows the forecastle head deck, windlass, seamen's quarters, cargo winch at the foremast and forward cargo hatch.

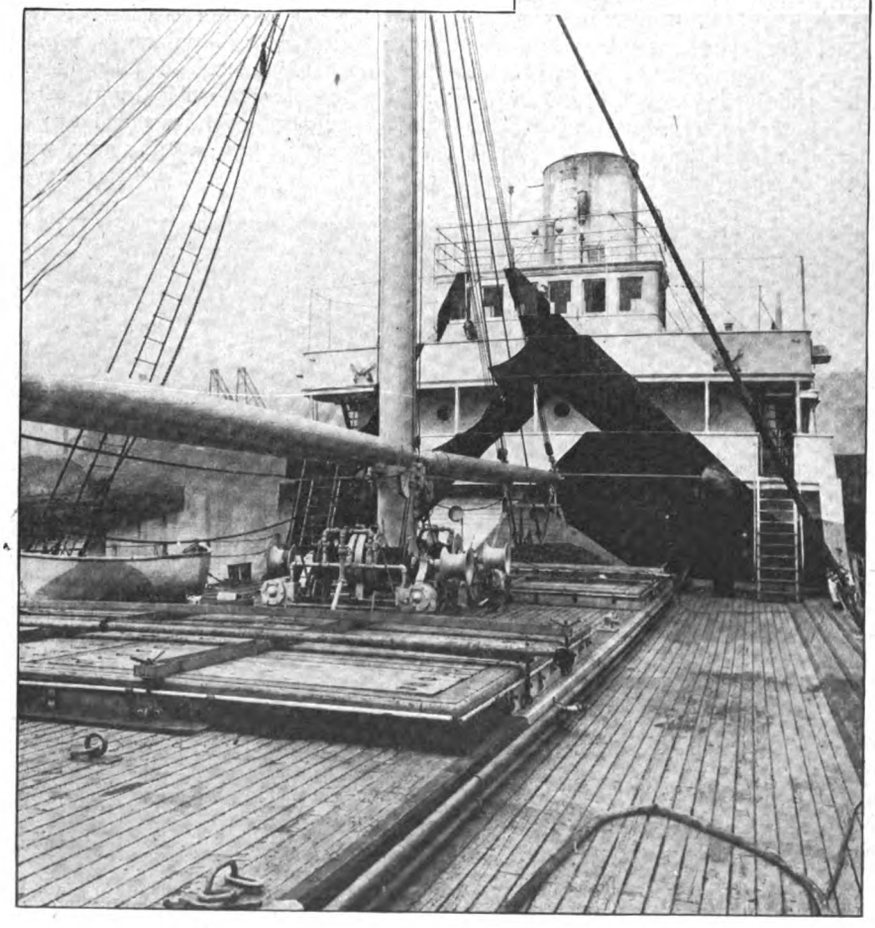

Fig. 5—Looking aft from the forward cargo hatch. This view shows the two cargo winches at the mainmast, cargo hatches, poop, bridge, officers' quarters and wheel house.

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steering gear, to be used in emergency, and a steam windlass with a 1 3/16-inch chain capacity.

An important feature that has been adapted from Great Lakes' design is the placing of the propulsion machinery well aft. While this installation may appear out of place to many who are accustomed to salt water craft, in which the boilers and engines are generally placed amidships, several advantages are to be gained, the value of which should not be underestimated. This design, Mr. Herriman points out, saves valuable hold space that otherwise would be taken up by the shaft tunnel and permits the use of a short propeller shaft in which torsional strain is considerably lessened. The greatest advantage, however, is that it is much easier to keep a comparatively short propeller shaft in alignment. A wooden vessel is bound to hog as she grows old. As a matter of fact, instances have been known where a hogging of 2 feet was found. In a wooden vessel with her engines placed amidships, it is evident that even a slight amount of hogging brings an undue strain on the propeller shaft if it is not aligned frequently. With the engines placed aft, hogging has but little effect on the propeller shaft alignment. Again, aft location does away with the undue strain to which a long shaft is subjected when a vessel is laboring in a heavy sea.

Rudder Repairs Easily Made

The vessel's rudder and stern post are steel castings, while the rudder stock is turned from a steel forging. The two members are fastened together by a coupling just below the rudder trunk. It is said that this design offers distinct advantages. Vessels often damage their rudders and rudder stocks by backing into a dock, or another vessel. This is generally a serious mishap to a vessel in which the rudder and stock are made integral. With the STURGEON BAY, however, such an accident could be repaired easily as it would be only necessary to uncouple the rudder from the stock and unship it or pull the stock as occasion required. The coupling is shown plainly in Fig. 1.

The engine and boiler room are separated from the rest of the hold by a watertight bulkhead and to guard against the possibility of fire, the casings around the boilers and engines are steel. Steam is supplied by two Scotch boilers 14½ feet diameter and 11 feet long, placed side by side, fore and aft. The engine is of the triple-expansion type with cylinders 21, 32 and 54 inches bore x 42-inch stroke. In place of the customary type of air pump, driven from one of the crossheads, an independent unit has been installed. The object of this is to afford a better vacuum when the engine is running at high speed than is possible with a direct connected pump. The condenser is of the surface type with a 1500-foot cooling surface.

Equipment is Complete

Other engine and boiler room equipment include two boiler feed pumps, 7½ x 4½ inches, with 10-inch stroke; general service pump, 10 x 6 inches with 10-inch stroke; sanitary pump, 6 x 4 inches, with 6-inch stroke; fresh water pump, 4½ x 2¾ inches, with 4-inch stroke; 10-ton evaporator, feed water heater and a 10-kilowatt dynamo.

Lake vessels are noted for the ample quarters afforded both officers and crews and this important detail was not overlooked in designing the STURGEON BAY. The officers' quarters, hospital, wireless room, purser's office, cook, stewards' and mess boys' quarters, firemen's and seamen's mess, the officers' dining room, galley, pantry and storeroom are located aft. The seamen's quarters are in their time-honored place under the forecastle deck.

The STURGEON BAY is fitted with every modern convenience both as regards the comfort of the officers and crew and the safety of the vessel. Her supply of navigating instruments is unusually complete, including a modern sounding machine.

Deep-water navigators who have inspected the STURGEON BAY are much impressed with the vessel and predict that she will make a splendid showing as a cargo carrier. The consensus of opinion is that the vessel, with her exceptionally rigid construction, compares favorably in this respect with many vessels built to withstand the enormous pressure of ice floes encountered in arctic seas. Wisconsin's first wood contribution to the new merchant marine is pronounced to be one of the best examples of wooden ship construction ever launched on inland waters.

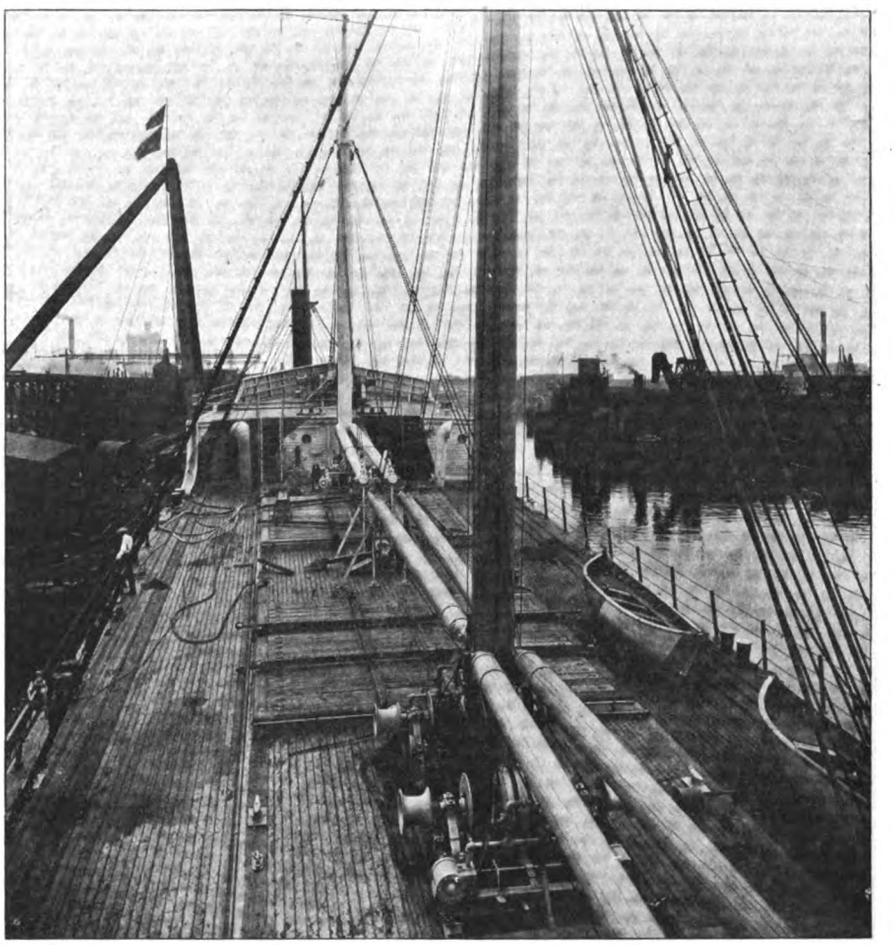

FIG. 6—GENERAL DECK VIEW AS SEEN FROM THE BRIDGE. NOTE THE UNOBSTRUCTED VIEW AFFORDED THE QUARTERMASTER FROM HIS POSITION AT THE WHEEL

The New South Wales government is to build six ships at Walsh island, Newcastle, under the supervision of the commonwealth. It is expected that the first boat, of 5500 tons displacement, will be launched in six months, and one every four months later until the six are turned out. The program of the government itself seems to have been indefinitely delayed by labor troubles.

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American Ship Yard Activities

A Snappy Summary of the Leading Events of the Month in the Vessel Construction Field

July a Busy Month for West Coast Yards

SO large was the turnout of ships at north Pacific ports and so many records of various kinds were shattered that July is likely to stand out as a red letter month in shipbuilding annals for a long period.

During the month, the yards of Oregon, Washington and British Columbia launched a high number of vessels as follows: Wood, 39; steel, 14; composite, 2. During July the first composite vessels were sent into the water, a Vancouver, Wash., yard launched six wooden ships in one day, the first ocean-going ship was launched on Lake Washington, near Seattle, and the Skinner & Eddy yard, Seattle, had two speedy launchings: The WEST HOBOMAC in 49 days after the keel was laid, and the WEST GOTOMSKA in 50 working days.

Efficiency Is Evident

The month's output of ships of all classes shows how smoothly the shipbuilding organizations of the north Pacific are now operating. The 55 vessels launched at Oregon, Washington and British Columbia yards since July 1 have a total deadweight tonnage of 261,850, a most creditable showing. The segregation in three groups is as follows:

	No.	D. W. Tonnage
Wooden	39	133,650
Steel	14	119,200
Composite	2	9,000
	55	261,850

In Table II the tabulations show the month's record for each of the districts embraced.

Of the month's total more than half

Table I

North Pacific Launching Record for July

July 5—ADMIRAL MAYO, 3200-ton auxiliary schooner, by Puget Sound Bridge & Dredging Co., Seattle.

July 4 — BLYTHEDALE, 2500-ton wooden steamer, by Pacific American Fisheries Co., Bellingham, Wash.

July 26—BRISK, 3500-ton auxiliary schooner, by National Shipbuilding Co., Seattle.

July 4—CHINO, 3500-ton wooden steamer, by Seaborn shipyards, Tacoma, Wash.

July 4—DELIGHT, 7500-ton steel steamer, by Skinner & Eddy Corp., Seattle.

July 4—WEST GAMBO, 8800-ton steel steamer, by Skinner & Eddy Corp., Seattle.

July 17 — WEST GOTOMSKA, 8800-ton steel steamer, by Skinner & Eddy Corp., Seattle.

July 25—GAFFNEY, 7500-ton steel steamer, by Skinner & Eddy Corp., Seattle.

July 27 — WEST HOBOMAC, 8800-ton steel steamer, by Skinner & Eddy Corp., Seattle.

July 4 — WESTERN STAR, 8800-ton steel steamer, by J. F. Duthie & Co., Seattle.

July 4 — WESTERN CROSS, 8800-ton steel steamer, by J. F. Duthie & Co., Seattle.

July 29 — WESTERN HOPE, 8800-ton steel steamer, by J. F. Duthie & Co., Seattle.

July 27—L. J. DRAKE, 10,000-ton steel tanker, by Ames Shipbuilding & Drydock Co., Seattle.

July 27 — WAR CHARGER, 8800-ton steel steamer, by Coughlan Shipbuilding Co., Vancouver, B. C.

July 4 — CHALLAMBRA, 3500-ton wooden steamer, by Sloan Shipbuilding Corp., Olympia, Wash.

July 4—SEWICKLY, 3500-ton wooden steamer by Sloan Shipbuilding Corp., Olympia, Wash.

July 22—COOLCHA, 3500-ton wooden steamer, by Sloan Shipbuilding Corp., Olympia, Wash.

July 27—BERRINGA, 4200-ton wooden steamer, by Patterson-McDonald Co., Seattle.

July 4—DACA, 3500-ton wooden steamer, by Meacham & Babcock, Seattle.

July 4—WYUCAN, 3500-ton wooden steamer, by Meacham & Babcock, Seattle.

July 4—ANACORTES, 7500-ton steel steamer, by Todd Drydock & Construction Co., Tacoma, Wash.

July 19—PUGET SOUND, 7500-ton steel steamer, by Todd Drydock & Construction Co., Tacoma, Wash.

July 4 — BOURNEVILLE, 3500-ton wooden steamer, by Wright Shipyards, Tacoma, Wash.

July 4 — DUNKERQUE, 3000-ton wooden steamer, by Foundation Shipbuilding Co., Tacoma, Wash.

July 12—THANN, 3000-ton wooden steamer, by Foundation Shipbuilding Co., Tacoma, Wash.

July 25—TOUL, 3000-ton wooden steamer, by Foundation Co., Tacoma, Wash.

July 4—COLOMA, 3500-ton wooden steamer, by Tacoma Shipbuilding Co., Tacoma, Wash.

July 25—FASSETT, 3500-ton wooden steamer, by Tacoma Shipbuilding Co., Tacoma, Wash.

July 3—FORSTER, 3500-ton wooden steamer, by Nilsen & Kelez, Seattle.

July 3—OSPREY, 3250-ton wooden steamer, by Anderson Shipbuilding Corp., Houghton, Wash.

July 4 — MARATANZA, 3500-ton wooden steamer, by Commarstorm Shipbuilding Co., Portland, Oreg.

July 4—WAHZU, 3500-ton wooden steamer, by Commarstorm Shipbuilding Co., Portland, Oreg.

July 10—CABEZA, 3500-ton wooden steamer, by Coast Shipbuilding Co., Portland, Oreg.

July 7 — WESTERN COAST, 8800-ton steel steamer, by Columbia River Shipbuilding Corp., Portland, Oreg.

July 23—BRAEBURN, 4000-ton wooden steamer, by Peninsula Shipbuilding Co., Portland, Oreg.

July 4—NECOLAH, 3500-ton wooden steamer, by Grant, Smith, Porter-Guthrie Co., Portland, Oreg.

July 6—NASHOTAH, 3500-ton wooden steamer, by Grant, Smith, Porter Guthrie Co., Portland, Oreg.

July 4—ITAMIA, 3500-ton wooden steamer, by Grant, Smith, Porter-Guthrie Co., Aberdeen, Wash.

July 23 — WESTERN COMET, 8800-ton steel steamer, by Northwest Steel Co., Portland, Oreg.

July 1 — WALLOWA, 4500-ton composite steamer, by Supple & Ballin Shipbuilding Co., Portland, Oreg.

July 16—AIRLIE, 4500-ton composite steamer, by Supple & Ballin Shipbuilding Co., Portland, Oreg.

July 4—BONIFAY, 3500-ton wooden steamer, by Wilson Bros., Astoria, Oreg.

July 4—BENVELA, 3500-ton wooden steamer, by McEachern Shipbuilding Co., Astoria, Oreg.

July 4—COTTERAL, 3500-ton wooden steamer, by McEachern Shipbuilding Co., Astoria, Oreg.

July 4—JOHN W. WELLS, 3500-ton wooden steamer, by St. Helens, Shipbuilding Co., St. Helens, Oreg.

July 13—ARVONIA, 3500-ton wooden steamer, by G. M. Standifer Construction Co., Portland, Oreg.

July 13 — MONTEZUMA, 3500-ton wooden steamer, by G. M. Standifer, Construction Co., Portland, Oreg.

July 13—UMATILLA, 3500-ton wooden steamer, by G. M. Standifer Construction Co., Portland, Oreg.

July 13—BELDING, 3500-ton wooden steamer, by G. M. Standifer Construction Co., Vancouver, Wash.

July 13—MOOSABEE, 3500-ton wooden steamer, by G. M. Standifer Construction Co., Vancouver, Wash.

July 13—BENZONIA, 3500-ton wooden steamer, by G. M. Standifer Construction Co., Vancouver, Wash.

July 4—BRONCHO, 4000-ton wooden steamer, by Grays Harbor Shipbuilding Co., Aberdeen, Wash.

July 4 — BLUE EAGLE, 3000-ton wooden steamer, by Rodgers Shipbuilding Co., Astoria, Oreg.

July 20—KENOSHA, 3000-ton wooden steamer, by Sanderson & Porter Shipbuilding Co., Raymond, Wash.

July 4 — WAR CASCO, 3000-ton wooden steamer, by Western Canada Shipyards, Ltd., Vancouver, B. C.

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the deadweight tonnage was sent into the water on July 4, as a patriotic demonstration. Several other launchings took place within a day or two before or after the national holiday. High water in the Columbia river prevented the original plans for that district being carried into effect on July 4, but it brought the Columbia river the added distinction of sending six wooden ships into the river in one day, a feat heretofore unheard of on the Pacific coast.

The launching of the OSPREY at the Anderson yards, Houghton, Wash., on Lake Washington was an important event for only by the completion of the Lake Washington canal and locks could sea-going vessels be constructed on the lake.

The yards of J. F. Duthie & Co., Seattle, established a new record for a yard of that size by launching three 8800-ton steel freighters within a period of 25 days. The WESTERN HOPE, launched July 29, was originally intended for September delivery but the workers speeded up and sent the hull into the water six weeks in advance of the original time set.

In the 25-day period ending July 27, Seattle yards alone launched eight steel and three wooden ships for the Emergency Fleet corporation or a total of 76,000 tons of steel and 14,200 tons of wood. In addition, local yards sent into the water in the same period four wooden steamers for other interests, the total being 15 ships or 90,200 tons in 25 days, a daily record of more than 3600 tons.

The Skinner & Eddy Corp. established a new Pacific coast record by launching the WEST HOBOMAC in 49 working days, or one day less than was required for the WEST GOTOMSKA, also a July offering. The WEST GAMBO was the first July 4 launching delivered to the government, this ship being turned over July 20, or 15 days after launching. The WEST HOBOMAC is the twenty-first steel vessel launched by this yard for the government and is the eighth 8800-ton ship launched in quick succession in an average of 54 working days from laying of keel. This record has been established by the following succession of launchings:

WEST LIANGA, 55 days; WEST ALSEK, 58 days; WEST APAUM, 55 days; WEST COHAS, 55 days; WEST EKONK, 57 days; WEST GAMBO, 59 days; WEST GOTOMSKA, 50 days, WEST HOBOMAC, 49 days.

The composite ships launched at Portland by the Supple & Ballin Shipbuilding Co., are of the approved Ballin type and are expected to be successful carriers. They are larger than the average wooden vessel.

Wooden construction on the British Columbia side has slowed down and at the present time there are many idle ways. From all reports, the Canadian government is not prepared to award additional contracts and the yards are awaiting government approval before accepting private work. Foreign interests are reported to be in the field ready to place contracts. In some instances, disputes between owners of yards and the government as to the values of the yards and the repayment of money advanced by the government are in process of settlement but in the meantime the operators are not in position to bid for new business.

Capt. H. C. Hansen, ship owner, Porsgrund, Norway, has just awarded a contract for three wooden schooners to the Cholberg yards, Victoria, B. C. These ships are to be full sail, but are to be built so that auxiliary engines may be installed at a later date. They are to be of the following dimensions: Length, 207 feet; beam, 40 feet; depth, 19½ feet; lumber capacity, 1,350,000 feet. After they have served the allied governments, if they are commandeered, they are intended for the Baltic and North sea trades after the war. Puget sound yards are so busy that Captain Hansen was unable to place his contracts on this side. Table I shows the launchings at north Pacific yards during July.

Table II

July's Record for Five Districts

	—Wood—		—Steel—		Composite		—Total—	
	No.	Tonnage	No.	Tonnage	No.	Tonnage	No.	Tonnage
Puget Sound	18	60,650	11	92,800	..	....	29	153,450
Columbia River	17	59,500	2	17,600	2	9000	21	86,100
British Columbia	1	3,000	1	8,800	..	....	2	11,800
Grays Harbor	2	7,500	..	.....	..	....	2	7,500
Willapa Harbor	1	3,000	..	.....	..	....	1	3,000
	39	133,650	14	119,200	2	9000	55	261,850

Size of Squantum Plant

Present-day undertakings in the construction field are distinguished by size and speed. Contracting firms that four years ago would have looked upon a million-dollar contract as large are today as readily undertaking work that runs up into the tens of millions and are handling men by the thousand and material in heretofore unheard of quantities.

The following authentic figures regarding the largest destroyer plant in the world at Squantum, Mass., are, therefore, of peculiar interest. This plant, built by the Aberthaw Construction Co., Boston, for the Bethlehem Shipbuilding Corp. was started in October, 1917, and the work carried through to completion during one of the most severe winters that has visited New England for many years. The site when the builders started work consisted of a marsh with a few areas of upland here and there that were slightly above high tide level. In order to make land on which to erect buildings, 1,250,000 cubic yards of filling had to be deposited.

About two-thirds of this quantity was dredged up from the harbor by the dredges which were forming the launching basin and channel that connects with the main ship channel. The remainder of the material was dug by steam shovels in various adjoining gravel pits. In order to move this amount of material a travel of 140,000 car miles was recorded.

Five thousand freight cars full of building material were brought to the job. The size of this can be appreciated if it is remembered that these cars placed end to end would reach from Boston to Worcester, Mass. In addition to this, 50,000 truck loads and teamloads of material of various kinds were brought over the state highways.

Most of the buildings are built upon piles, about 500,000 lineal feet of wood and concrete piling being driven.

The steel framing of the buildings called for 11,000 tons. The areas of the roofs of the buildings amount to 30 acres, and the perimeter of them is just under three miles. There are 12 acres of window glass in the job requiring 110 tons of putty to fasten it in place. Six miles of standard gage railroad track were laid around the buildings and in connecting to the main line of the New York, New Haven & Hartford railroad. In addition to this, two miles of narrow gage track and four miles of trolley line to connect with the Boston Elevated railway were put in.

The wood roofs and wharves and docks and temporary buildings called for a total of 10,000,000 board feet of lumber, the bulk of which was cut in the south. Thirty miles of piping were needed in order to take care of the needs of water and sewerage, steam, compressed air, fuel oil, sprinkler lines, fire mains, etc., and 16,000 sprinkler heads were installed to protect the buildings from fire. There were 8000 gallons of paint needed for windows, steel and woodwork. This insures permanency.

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For carrying through the great undertaking, the Aberthaw company added quickly to their permanent organization enough men to make up a total of nearly 6000. They have now under way for the same client a far larger undertaking on the Pacific coast that may eventually call for the work of 20,000 men.

Builds Many Wooden Schooners

One of the leading builders of wooden ships on the Pacific coast is the Foundation Co. This New York corporation has three yards in the Pacific northwest, one at Portland, Oreg., one at Tacoma, Wash., and one at Victoria, B. C. A total of 8300 men are on the payroll of the three yards. There are 10 ways at the Portland yard, 10 at the Tacoma yard, and four at the Victoria yard. The Portland and Tacoma yards are building 5-masted steam auxiliary schooners for the French government, while the Victoria yard is building for the British government. The company has contracts for 40 vessels from the French government and four from the British. Eighteen ships have already been launched at the three yards and two have been completely fitted.

The Portland yard was entirely under water in August, 1917. A year later this yard had 10 ships moored at its fitting-out docks. The contracts call for the complete fitting out of the ships, which will be done at the yards where they are built. While the ships are under construction, the machinery is being assembled.

The vessels for the French government are built to the survey of the Bureau Veritas, while those for the British government are built to conform to Lloyd's survey. The vessel shown in the accompanying illustration is the LIEUTENANT GRANIER, recently launched at the Foundation Co.'s Portland yard for the French government.

Contracts Awarded

The Emergency Fleet corporation is to award contracts for 65 more Ferris-type ships and 125 ocean-going barges at an early date, according to James O. Heyworth, chief, wood ship division.

"One-third of these new craft will be allotted to the yards of the district, which extends from Houston, Tex., to Florida," Mr. Heyworth announced. "The hull of a Ferris ship costs about $350,000, and the barges represent an investment of $190,000, so that the district's share of 20 ships and 40 barges will represent an outlay of practically $14,600,000.

"We do not contemplate building any new yards," said Mr. Heyworth. "What we want to do is to increase the output of those now in existence. Every yard that meets the conditions of the Emergency Fleet corporation will be given some of the new contracts. It is impossible to say how long after the war this building program will be continued, but we will need tremendous tonnage. In the meantime, the wooden ships we are putting into coastwise trade will release the steel tonnage to carry soldiers, munitions and food supplies to France."

Standardization of the interpretation of the plans and specifications of the

WOODEN MOTORSHIP LIEUTENANT GRANIER TAKING THE WATER

Emergency Fleet corporation for its ships was explained by Mr. Heyworth as the main object of his visit to the south.

"It is for the purpose of standardizing, even to the smallest detail, the construction of ships in order that production may be increased and the cost of that production correspondingly decreased," he said.

"The specifications of the Emergency Fleet corporation's ships are written in plain English, yet you would be surprised at the many interpretations different shipbuilders will put on these specifications. This is natural, however, for two men rarely see the same thing alike, and two men rarely will interpret the same specifications alike, especially when it comes to details."

Mr. Heyworth said that he has in mind several changes in methods of construction and specification, which he believes will add materially to the speed with which southern shipyards can turn out their product.

"One of these changes," he said, "has to do with the fastening of timbers in ship construction. Another change we hope to be able to make will permit of the use of small timbers in the construction of vessels. This would be of great advantage to the south, where it sometimes is difficult to obtain timbers large enough to come up to the specifications as they are at present."

To Enlarge Plant

The Great Lakes Engineering Works, Detroit, is enlarging its Ashtabula plant. Additional land has been acquired, new buildings are being constructed, and new berths will be added to the yard. The total capital expenditure for the improvements now under way will amount to more than $500,000. When the new additions are completed, employment will be given to from 2000 to 2500 men.

In connection with the development of the plant it is understood that the Emergency Fleet corporation contemplates building a large number of homes at Ashtabula to house the workers in the yards. This will be done through the housing department of the corporation.

The Ashtabula yard of the Great Lakes Engineering Works was built in 1909 and until the war it employed about 250 men. The first ship launched was the LOUIS R. DAVIDSON, an ore carrier now in service on the lakes. The DAVIDSON is 504 feet long, 56-feet beam with a registered tonnage of 6356 gross. She was built in 1912. Ten canal-size ocean-going ships will be delivered to the government during the present year. John R. Russel, president, is authority for the statement that the company expects to build 15 ocean-going cargo carriers at the Ashtabula plant in 1919.

Savannah is Busy

Deptford tract, a site fronting the Savannah river at the entrance of Savannah harbor, Savannah, Ga., is now the seat of a fast growing shipbuilding industry. The Terry Shipbuilding Corp. has completed fundamental steps for constructing an 8000-ton drydock, the initial investment being $1,000,000.

The drydock will be large enough to hold four 300-foot composite vessels which are under construction at the corporation's Port Wentworth plant, a few miles below Savannah. The initial order of lumber for the drydock amounted to 1,000,000 feet and the full amount to be used is expected to exceed that amount several times.

Another plant recently located at Savannah is the Concrete Shipbuilding Co. Ivar Widing, general manager of the company, announces that it has a contract to build two reinforced concrete vessels for the government. These

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vessels are to be 120 feet long, 20 feet beam and will have a deadweight capacity of 500 tons.

Mr. Widing recently brought to Savannah a model of the vessels his company is to build. The model is really a serviceable vessel in minature as it is 41 feet overall with a 11-foot beam. This vessel was built in Boston, since when it has made many trial trips which, Mr. Widing points out, were entirely satisfactory.

Work on the new concrete plant is well under way. Wells have been bored to assure an ample supply of fresh water for mixing concrete, machinery has been installed and piling is being driven for the launching ways. The actual construction work on the vessels will begin in the near future. The ships will probably be launched sidewise.

Rare Woods Used in Shipbuilding—V

By C. D. Mell

THE African oak, or teak, is neither an oak nor true teak. It is not even related to these woods. Botanically speaking, it is the *Oldfieldia Africana* of Sierra Leone and the Gold Coast, where it is called *mandji* or *eloum* by the natives. In the trade it is sometimes referred to also as African mahogany or African walnut; in the German market it is known as African teak, and the French call it *bois de teck d' Afrique* or *teck du Gabon*. This wood must not be confused, however, with the several species of *Lophira*, viz., *L. procera* and *L. alata*. The wood of the former, which is known locally as *ekki*, also comes into the English market as African oak, but it can readily be distinguished from that of *Oldfieldia Africana* by its excessively hard, dense and deep red wood having numerous conspicuous pores filled with a white deposit.

The African oak is classed among the largest trees in the West African forests. It is not unusual to find trees that have clear trunks for 60 feet or more with a diameter of 3 feet, breast high. Many of the logs that formerly came to London and Liverpool markets were from 30 to 40 feet long and 2 feet square.

When these logs were first shipped to England, about 1819, they were poorly hewn and squared. No attempt was made to square them in the same careful manner as the cedar and mahogany logs from the West Indies. As a result of this, the logs had to be sawed square in the shipyards in England and in many cases the logs showed a waste of fully 50 per cent. However, there was a considerable demand for the wood, and large quantities were cut and shipped annually until about 1850, when the available supply diminished rapidly. In 1841 England received about 13,000 loads, amounting to 7,800,000 board feet. In 1853 the imports did not exceed over 7000 loads or 4,200,000 board feet. Between the years 1855 and 1858 the imports were less than 5000 loads, equaling 3,000,000 board feet.

The use of the wood has been rapidly declining chiefly because of the introduction of iron and steel in ship construction. Moreover, all the easily accessible trees have been cut down along the water courses and in the interior they are scarce. Forest officers of West Africa reported that the wood cannot now be obtained in quantities sufficient to interest shipbuilders with the present means of transportation from the stump to the shipping port. Timber cutting licenses in the region of Sierre Leone and the Gold Coast specifically state that no tree of the species of *Oldfieldia Africana* of less than 8 feet in girth at a point 4 feet 6 inches from the ground may be felled.

A Difficult Wood to Work

The wood is dark red, hard, strong, stiff, close and straight-grained and fairly free from checks. It shrinks and warps but little. It is somewhat difficult to work, but it is very durable under almost all conditions. There is a case on record showing that beams after having been in use for 50 years in an English warship were later used satisfactorily for artillery wagons and for spokes of motor cars. The wood possesses properties resembling those of mahogany and the best grades of oak and teak, but it is somewhat heavier and harder. It rarely opens up at the ends even when exposed for a long time to the drying influences of the sun and wind.

These remarkable characteristics of African oak attracted the attention of of the early travelers in West Africa, and in 1819 the first consignment of logs arrived in the London market, where it was at once requisitioned for shipbuilding. It was found suitable for beams, keelsons, riding bitts, stanchions, etc., and was classed in the second line in Lloyd's Register. At one time, shipbuilders considered it almost too heavy for use in building wooden merchant ships, but it was always highly esteemed in the construction of steel ships.

A. Smith in the *Treasury of Botany* writes as follows: "Though nearly one-third stronger than either English oak or Malaba teak, African oak is not so generally useful as those woods, its ponderous weight distracting greatly from its value and rendering it unsuitable as an exclusive material for shipbuilding, the vessels built entirely of it being too heavy. It is, however, very useful in certain parts, such as for beams, keelsons, waterways, shelf pieces, as it will stand a great degree of heat in the wake of fires, where there is a free current of air. In confined situations, it decays rapidly. The sapwood, like that of other timbers, is also subject to decay, and even the solid heartwood does not escape the attacks of large larvae, or from being perforated by teredos.

Few woods can be said to be immune to these marine insects. Even teak and mahogany are attacked. It is believed that true greenheart of British Guiana, a description of which appeared in THE MARINE REVIEW for June, 1918, is one of the few woods that appear to withstand the ravages of these borers.

Lake Yards to Build Ocean Tugs

The Lake & Ocean Shipbuilding Co., a recently organized Cleveland concern, has received a contract from the Emergency Fleet corporation for three ocean-going tugs with prospects of more business of a like nature. These vessels are to be fabricated and all material is to be furnished by Cleveland concerns. It is expected that this will save many days time which is generally consumed in delivery when semifinished material is shipped to the assembling yard from distant points.

The vessels are to be 150 feet overall length, 27½ feet beam with 15 feet draft. Their deadweight capacity is 800 tons. The propulsion machinery will be placed amidships and comprises two Scotch-type marine boilers placed side by side, fore and aft, and a triple expansion inverted type reciprocating engine.

The company's yard is to be located in close proximity to the National Iron & Wire Works, where part of the material is to be fabricated. The Variety Iron Works will also furnish some of the fabricated parts. Other Cleveland concerns who will furnish material are: Macbeth Boiler Co., boilers; Ohio Ma-

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Canadian Yards Have Large Contracts

THE following ships are now under construction in Canadian shipyards, according to an announcement issued by the authorities. These ships are being built for British authorities and private interests:

Steamships—Atlantic Coast

Canadian Vickers, Ltd., Montreal—Two cargo steamers, 9400, steel; one dredge, 2360, steel; 12 trawlers, 3050, steel; 23 drifters, 3450, wood.

Davie Shipbuilding & Repairing Co., Levis, Que.—One car ferry, 5000, steel.

Grant & Horne, St. John. N. B. —One cargo steamer, 2800, wood.

Marine Construction Co. of Canada, Ltd., St. John, N. B.—One auxiliary schooner, 750, wood.

Nova Scotia Steel & Coal Co., Trenton, N. S. — Two cargo steamers, 3000, steel.

Quebec Shipbuilding & Repairing Co., St. Laurent, Que.—Two cargo steamers, 2600, wood.

Quinlan & Robertson, Quebec, Que.—One cargo steamer, 2700, wood.

Southern Salvage Co., Liverpool, N. S.—One cargo steamer, 2500, wood.

Steamships—Great Lakes

British-American Shipbuilding Co., Welland, Ont.—Two cargo steamers, 4700, steel.

Collingwood Shipbuilding Co., Collingwood, Ont.—Three cargo steamers, 7200, steel.

Great Lakes Dredging Co., Fort William, Ont.—One cargo steamer, 1700, wood.

Midland Shipbuilding Co., Midland, Ont.—Three cargo steamers, 6000, steel.

Polson Iron Works, Toronto, Ont.—Six, 2640, steel.

Port Arthur Shipbuilding Co., Port Arthur, Ont.—Six cargo steamers, 12,091, steel; six trawlers, 1530, steel.

Thor Iron Works, Toronto, Ont.—One cargo steamer, 2437, steel; two trawlers, 540, steel.

Toronto Shipbuilding Co., Toronto, Ont.—Two cargo steamers, 6000, wood.

Steamships—Pacific Coast

Cameron-Genoa Mills, Shipbuilders, Ltd., Victoria, B. C.—Four 6500 cargo steamers, wood.

J. Coughlan & Sons, Vancouver, B. C.—Six cargo steamers, 17,190, steel.

Foundation Co., Victoria, B. C. —Five cargo steamers, 6500, wood.

William Lyall Shipbuilding Co., Vancouver, B. C.—Six cargo steamers, 6500, wood.

New Westminster Construction Co., New Westminster, B. C.—Four cargo steamers, 6500, wood.

Pacific Construction Co., Port Coquitlam, B. C.—Two cargo steamers, 6500, wood.

Wallace Shipyards, Ltd., North Vancouver, B. C.—Four cargo steamers, 17,500, steel; two freight steamers, 11,000, steel.

Western Canada Shipyards, Ltd., Vancouver, B. C.—Six cargo steamers, 6500, wood.

Sailing Schooners—Atlantic Coast

Chester Basin Shipbuilders, Chester Basin, N. S. — One schooner, 135, wood.

Clare Shipbuilding Co., Meteghan, N. S.—One schooner, 350, wood.

G. M. Cochrane, Fox River, N. S.—One schooner, 450, wood.

Dowling & Stoddart, Port Clyde, N. S.—One schooner, 175, wood.

Ernst Shipbuilding Co., Mahone Bay, N. S.—One schooner, 162, wood.

Falmouth Shipbuilding & Transportation Co., Windsor, N. S.—One schooner, 405, wood.

L. F. Graham, Port Greville, N. S.—One schooner, 360, wood.

W. R. Huntley, Parrsboro, N. S.—Two schooners, 620, wood.

Dr. McDonald, Meteghan, N. S. —One schooner, 544, wood.

W. C. McKay, Shelbourne, N. S.—Three schooners, 480, wood.

W. K. McKean & Co., Liverpool, N. S.—One schooner, 400, wood.

Nova Scotia Shipbuilding & Transportation Co., Liverpool, N. S.—Two schooners, 875, wood.

J. N. Rafuse, Conquerall Bank, N. S.—One schooner, 400, wood.

Robar Bros., Dayspring, N. S.—One schooner, 140, wood.

Smith & Ruhland, Exrenburg, N. S.—Two schooners, 225, wood.

Southern Salvage Co., Liverpool, N. S.—One schooner, 185, wood.

P. A. Theriault, Belliveaux Cove, N. S.—One schooner, 339, wood.

Wagstaff & Hatfield, Port Greville, N. S.—One schooner, 400, wood.

Yarmouth Shipbuilding Co., Yarmouth, N. S.—One schooner, 175, wood.

chine & Boiler Co., engines; Kinney & Levan Co., furnishings, and Upson Walton Co., rigging material. The vessels are to be delivered to the government fully equipped.

The yard is to be modern in all respects and will contain the necessary buildings to accommodate the mold loft, carpenter shop, fitting shop, blacksmith shop and other departments. Two launching ways are to be provided for sending the vessels to the water sideways, according to Great Lakes practice. The fitting out dock is to be of ample capacity to accommodate several vessels at one time as the company intends to engage in a certain amount of repair work as soon as the government's requirements are taken care of.

The officers of the company are: James Craig, president; J. J. Cassidy, vice president, and W. A. Fay, secretary and treasurer. The company will begin active construction on the vessels in the near future and it is expected that the first one will be launched before the close of navigation this fall.

Supply Depot for Gulf Yards

The Emergency Fleet corporation announced recently that it will establish a shipbuilding supply depot in New Orleans, from which to supply and restock all the plants on the gulf coast that have government contracts. The announcement comes from Baltimore, where it was made with the consent of Charles M. Schwab. According to this announcement there are to be seven of these depots located as follows: New Orleans, Baltimore, New York, Philadelphia, Chicago, San Francisco and Seattle.

The depot will save the shipbuilders of the gulf coast many days of delay in obtaining supplies. It is simply putting into effect, in shipbuilding, the army system of quartermasters' supply stations. Any shipbuilder on the gulf coast needing supplies will be able to get them in a few hours from the New Orleans warehouse. About 10 shipyards will be supplied. Apparently, the project means great expediting of the shipbuilding program on gulf coast.

Aid for Mail Service

W. S. Winckler, superintendent of mails at the Detroit river station, has made some suggestions for the benefit of the marine service. For towing the mail boat while passing Detroit he recommends that provision be made for making fast the mail boat's painter. Some trouble has been experienced through making painters fast where no chafing gear is available to protect the painter from coming in contact with sharp edges.

Mr. Winckler suggests that two pieces of oak be fastened to the ship's deck rail, one forward and one amidships on the port side. Such an arrangement would prevent the parting of painters to a great extent. The steamers JAMES S. DUNHAM, E. L. PIERCE, HUGH KENNEDY and the POLYNESIA have placed chafing gear of this description.

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To Build Battleships

Two of the 40,000-ton battleships authorized by congress will be constructed at the Brooklyn navy yard. Secretary Daniels, it was learned recently, has approved the building of ways at that yard for this purpose.

The ships are included in the 3-year building program for the navy and represent the largest battlecraft ever planned, exceeding any existing battleship by almost 10,000 tons.

They are to carry twelve 16-inch guns each and to have a speed of 25 knots.

Builds River Barges

The Dravo Contracting Co., engineering works department, Neville Island, Pa., has built several steel barges for river service. These vessels are of 600 tons capacity and have sealed air compartments with cargo decks above the water line. It is said that this design has proved satisfactory on the rivers because of the added buoyancy and the elimination of damage to the cargo from small leaks in the hull.

The barge shown in the accompanying illustration was launched July 4 and is the third steel barge to be launched by the Dravo company within a period of three weeks. Immediately after the barge was launched a keel was laid for a stern-wheel towboat. The company is also working on another 600-ton barge and three towboats. In addition, the company has also built several maneuver boats for the government. These are operated on the Ohio river.

Portland Yards Are Active

The monetary value of the wood shipbuilding industry at Portland, Oreg., can be measured, but the machine has not been invented that could gage the patriotism of the "fightin' hounds" who make up the shipbuilding crews. With the workmen around the yards, the building of a ship is no longer a matter of money; they have gotten hold of the big idea of winning the war by supplying ships.

Just as there is an army of engineers, railroad builders and transportation men back of the line in France to rush forward the supplies, so there is in Portland an army back of the first line of shipbuilders and its duty is to house and feed the men in such manner that efficiency will be kept at highest pitch. With no vacant homes in Portland, the back of the line squad is somehow or other housing the workmen and their families. Some of the companies, like the Grant Smith-Porter Guthrie Co., are building bungalows and selling them to their employes at cost. Others, notably the Guy M. Standifer corporation, are building or intend to build large hotels near their various plants. At Vancouver, Wash., just over the Columbia river from Portland, Mr. Standifer is erecting a 3-wing hotel. It will contain 500 rooms and will face an attractive park. Either side of the park and on the streets running into it will be bungalows.

July 30 marked the close of the first cycle in the history of the Grant Smith-Porter Guthrie Co. It was celebrated by the launching of the fifteenth hull, the TILLAMOOK. In July, 1917, the place now occupied by the yard was a marsh. Today the ground is occupied by eight ways, and alongside the dock there must be six ships in process of completion of equipment in order that the force of workmen may be kept busy.

Just a few moments before the TILLAMOOK took the water the MORITZ sailed from the dock on her first trial trip. She made the seventh fully-equipped ship delivered by the yard to the Emergency Fleet corporation during the months of June and July.

The workmen who have made this possible have earned from the Grant Smith-Porter Guthrie Co. a recreation hall and an auditorium where weekly dances are conducted for employes and their families. Every night a school in shipbuilding is also conducted there.

As the accompanying table shows the 10 wood shipyards of Portland are scheduled to build 150 vessels valued at $80,000,000 during the present year. The total tonnage amounts to 540,000.

Every ship launched at the Grant Smith-Porter yard is sponsored by the wife, daughter, sister or mother of one of the workmen who helped build her.

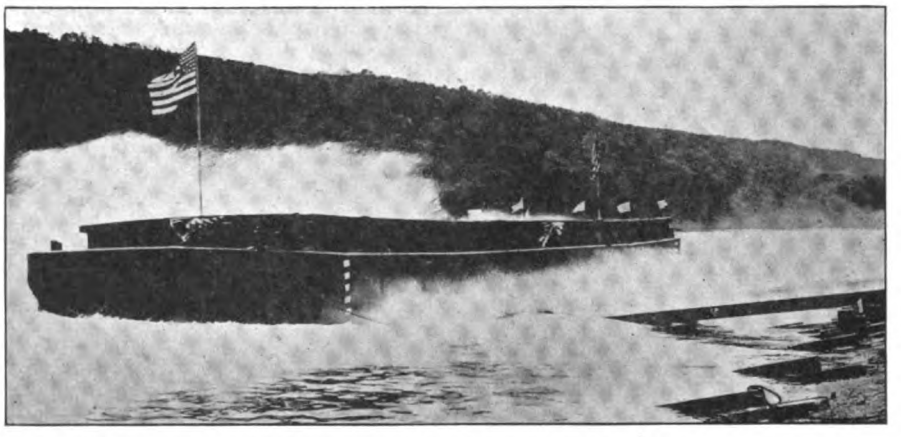
Motor Drive in Shipyard

The Newburgh Shipyards, Inc., Newburgh, N. Y., which specializes on standard 9000-ton steel cargo vessels, is one of the yards made necessary by the present war demand for all kinds of vessels. The structural steel shop is in active operation and the system of motor drive employed is of special interest because it is a typical example of an emergency war installation.

Some of the conditions which were taken into consideration in laying out the drive follow: The machinery must be arranged to allow rapid and economical production. The machines are operated by more or less unskilled men and they have to be safeguarded as completely as possible. Time is a vital factor and as deliveries of special apparatus were at that time slow, the best possible use had to be made of such available equipment as could be obtained within a reasonable length of time.

Electric power was available and thus the erection of an isolated power plant was not necessary. In order to insure maximum output for each machine and to provide complete flxibility as to the arrangement of the machines in the shop, it was decided to use individual motor drive throughout.

The power house supplies alternating current as practically all the machines



LAUNCHING A 600-TON STEEL BARGE IN THE OHIO RIVER. NOTE THAT THE VESSEL WAS LAUNCHED SIDEWAYS ACCORDING TO GREAT LAKES PRACTICE

Portland's Wood Ship Program for 1918

	Number	Value
Wooden ships to be completed and delivered to the Emergency Fleet corporation during 1918	45	$30,000,000
Additional wooden hulls to be in the water and in process of fitting Jan. 1, 1919	105	50,000,000
Total cost of equipment 150 hulls	..	80,000,000

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in the shop are of the constant speed type and squirrel cage motors are used exclusively. The only exceptions are the furnace blower and the bending rolls, both of which require speed variation. The furnace blower, which supplies air for the fuel oil plate and angle furnaces, is driven by a slip-ring motor with a drum-type speed controller. The bending rolls where originally driven by a motor-generator set, but due to the fact that this equipment was antiquated, war conditions making it impossible to secure modern apparatus at the time when it was wanted, a variable-speed, alternating-current motor has been installed to fill its place.

Latest News from American Shipyards

GENERAL shipbuilding will be engaged in by the Standard Shipyard Co. recently incorporated at Wiscasset, Me., by Andrew F. Lane, F. F. Pendleton, A. H. Lennox and Leon A. Gray. The company's capital was placed at $100,000.

* * *

The Boston & Penobscot Shipbuilding Co., was recently incorporated at Boston, by G. H. Lucey, Swampscott, Mass.; E. M. McKay, Boston, and W. L. Burhoe, Reading, Mass., with $75,000 capital.

* * *

W. R. Green, Wilmot R. Evans and M. D. Green, all of Everett, Mass., recently obtained a charter to engage in the shipbuilding business, when they incorporated the Winnisimmet Ship Yard with headquarters at Chelsea, Mass. The company's capital was fixed at $24,800.

* * *

A charter to build ships has been granted Carl Vretman, Savannah, Ga.; M. L. Gilbert, New York, and Louis Lubchansky, New London, Conn., who incorporated the Connecticut Shipbuilding Corp. with headquarters at Mystic, Conn. The company is capitalized for $200,000.

* * *

A. R. Morrison, manager of the Foundation Co.-Port Huron Shipyard, Inc., Port Huron, Mich., is said to be preparing plans for the erection of an addition to the company's plant which will aggregate a layout of $800,000.

* * *

The R. T. Green Co., Chelsea, Mass., is assembling material for a 4-mast schooner to be built on lines of R. T. GREEN recently placed in commission. This yard is also busy with repair work.

* * *

The new Winnisimmet shipyard, Chelsea, Mass., is starting out with a number of important contracts among which are repairs on steamships LAKE BUTLER and LAKE NARKA. Both vessels were damaged while bound to Boston from the Great Lakes.

* * *

R. L. Bean, Camden, Me., has contracted to build three 4-mast schooners of about 1150 gross tons at a cost of $150,000 each. The Boothbay Harbor Shipping Co., Boothbay Harbor, Me., will build two 3-masters and the Atlantic Coast Co., Boothbay Harbor, is to lengthen the steamer WINTER HARBOR to secure added cabin accommodations.

* * *

Two 150-horse power oil engines are being installed in the ELIZABETH RUTH, the 1500-ton schooner launched recently by the Mississippi Shipbuilding Corp., Biloxi, Miss. The boat is 193 feet long, 37 feet beam and has a draft of 19 feet. She has been classified as A-1 by Lloyd's.

* * *

The plant of the Orange Maritime Corp., Orange, Tex., was destroyed by fire of unknown origin recently. Two large wooden hulls were burned and one seriously damaged. Two workmen, asleep in a sail loft, were burned to death. The loss approximated $1,000,000. The plant will be rebuilt, according to newspaper reports from the Texas city.

* * *

McBride & Law, Beaumont, Tex., expects to launch its second Ferris-type hull in September, having sent the first, BEAUMONT, into the water June 28. The company is capitalized at $150,000 and employs 400 men. It consists of R. J. McBride and Charles F. Law, and is owned entirely by these two men. The company has contracts to build four ships for the Emergency Fleet corporation.

* * *

Merrill-Stevens Co., Jacksonville, Fla., has launched the RED CLOUD, said to be the first composite ship completed in the south for the Emergency Fleet corporation. She is 285 feet long and has a carrying capacity of 3500 tons. Her speed is 10 knots an hour. The same company is at work on another hull of the same type.

* * *

The Fougner Concrete Shipbuilding Co., which was organized some time ago to build concrete ships, launched its first concrete barge from its new shipyard at North Beach, Flushing bay, in New York harbor, July 27. The new boat is 100 feet long and 32 feet wide, and has a displacement of 500 tons, with six compartments below deck for carrying oil and a wide sweep of decks for carrying cargo. The boat was built for the Standard Oil Co. of New York, and was completed within three months.

* * *

On July 20 the steamer WAR HATHOR was launched at the shipyards of the Port Arthur Shipbuilding Co., Port Arthur, Ont., Miss Hazel Whalen, daughter of the president of the company acting as sponsor. This steamer is being built on account of the imperial munitions board for ocean freight service.

* * *

The New York Shipbuilding Corp., Camden, N. J., recently awarded the McClintic-Marshall Construction Co., Pittsburgh, a contract for the erection of a group of new office buildings, machine shops, paint shops, shelter buildings, warehouses and galvanizing plants. It is estimated the work will cost in the neighborhood of $5,000,000.

* * *

The United States shipping board is said to be planning the erection of a machine shop at South Somerset, Mass., for the Crowninshield Shipbuilding Co. The building, according to present plans, will be 1-story, 75 x 100 feet.

* * *

Plans were recently completed whereby L. J. Simpson and Vancouver, B. C., and Portland, Oreg., interests will construct a shipyard and sawmill at North Bend, Oreg. It is estimated the yard will cost $500,000.

* * *

Contracts have been closed by the Leathem & Smith Co., Sturgeon Bay, Wis., for the construction of six large tugs for the United States shipping board. The company is planning to enlarge its yard in order to take care of this work.

* * *

Howard A. Flynn, Charles N. Taylor and William C. Dinsmore, all of Machias, Me., recently incorporated the Machias Ship Construction Co. with $100,000 capital.

* * *

An addition to cost in the neighborhood of $100,000 is to be erected by the William Lyall Shipbuilding Co., Ltd., North Vancouver, B. C. Plans are now being drawn. E. D. Cook is manager of the company.

* * *

Property was recently purchased at Greenpoint, L. I., by Anthony O. Boyle, of Brooklyn, N. Y., for use as a shipyard site. The site has a water frontage of 610 feet.

* * *

Plans have been completed for a 2-story office building, 23 x 87 feet for the Buffalo Drydock Co., Buffalo. It is estimated the building will cost about $8500.

* * *

The Hudson Shipbuilding & Repair Co., recently was incorporated at Jersey City, N. J., by W. W. Gearhart, A. G. Stewart, and Neta Murphy. The company was incorporated with $100,000 capital.

* * *

Work on the construction of the second unit of the proposed $2,000,000 submarine chaser plant to be erected at Kearney, N. J., by Henry Ford, has begun. The structure will be 400 x 1400 feet.

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Late Decisions in Maritime Law

Legal Tips For Ship Owners and Officers

Specially Compiled for The Marine Review

By Harry Bowne Skillman

Attorney at Law

IT was brought out in the case of ROYAL ARROW, 248 *Federal Reporter* 546, that the libelant shipped on board the vessel as mess boy for a voyage from San Francisco to Taku Bar, China, and return, and was discharged before the United States consul at Cebu, Philippine Islands, the reason for his discharge being his refusal to serve coffee to the men at 5:30 a. m. He had served the men at this hour on the voyage between San Francisco and Shanghai, in the expectation that he would, as was the custom, be paid by the men for such service. The men failing to pay him, he declined to render further service to them before 6 a. m. The shipping articles did not define the duties of a mess boy, but it appeared that their hours of service are, by the rules of their union, from 6 a. m. to 6 p. m. The court said: "In the absence of any specific contract, as libelant was employed through his union, it must be taken that, when respondent went to the union for a mess boy it was a part of the contract of employment that he should, except always in cases of emergency, work regularly at the union hours. If, with some understanding with the men, he worked longer hours, to be paid by them for the overtime, he could not ordinarily be compelled by the master to perform this extra work." The court then held that the master was not authorized to discharge the libelant for failure, in absence of any emergency, to go to work earlier than 6 a. m.

* * *

The court in the case of Dailey v. Carroll, 248 *Federal Reporter* 466, in passing on the liability of a scow owner for negligence of the master to the charterer, said: "It is, we think, impossible to lay down any hard and fast definition as to what is comprised in the phrase, 'caring for a boat.' To do so would require consideration of contingencies perhaps unforseeable, and certainly not suggested by anything in this record. Cases must largely depend upon special facts; but we may and do hold that an owner, who lets his boat and man to a chartered owner, *pro hac vice* thereby, in the absence of special agreement to the contrary, represents that the man or men who go with her are reasonably competent to attend to the care or internal economy of the vessel in question, and further that customary cleaning, pumping, mooring, and watching are parts of such care, and watching a vessel includes watching her lines. * * *

"If the man whom the owner pays and furnishes for this purpose fails, for example, to watch and arrange his lines according to the exigencies of the tide, he fails to serve the charterer just as much as the boat would fail to serve, should she be unseaworthy through no fault of the charterer. Third persons may, of course, regard charterers such as these libelants as owners, and the crew as the charterers' crew; but, as between the parties to the contract of charter, the question may always be asked: For whom was a given employe acting when the act complained of occurred?

"There can be no difference between injury to the boat caused by her master's negligence and injury by the boat similarly occasioned."

* * *

Agreement, as shown by bill of lading and charter party, providing that lighterage should be "at the risk and expense of the cargo," contemplated that any loss or damage suffered by the cargo during the lighterage without fault on the part of the respondent should be borne by the cargo, but not that the steamship should be exempt from liability for such loss or damage to the cargo through culpable negligence of her owner.—OGEECHEE, 248 *Federal Reporter*, 803.

* * *

A proctor in admiralty cannot have his fees allowed as costs, to be taken out of a general fund, recovered in a salvage suit, according to JOHNSON LIGHTERAGE CO., No. 24, reported in 248 *Federal Reporter* 74. The court said that there could be no authority for making such an allowance; that the authorities at hand leaned the other way. The proctors in the suit mentioned, the court said, were doubtless entitled to credit in creating the fund and were entitled to compensation, but their industry, having been exerted not on behalf of the court or the general litigation, but on behalf of their clients, the latter should be looked to for compensation.

* * *

A custom or usage as to payment of court charges by chartered vessels at Cuba cannot be permitted to vary a plain and unambiguous agreement as to such payment, according to the decision in the case of REBECCAH R. DOUGLAS, 248 *Federal Reporter* 366. It was also said in this case that where negotiations between parties amounted to an oral charter party, but that, when it was reduced to writing, it contained a material variation, the original agreement became and was invalid.

* * *

Rule 5 of Article 8, Inland Rules, requiring a steam vessel when nearing a short bend or curve in the channel, where, from the height of the banks or other cause a steam vessel approaching from the opposite direction cannot be seen for a distance of half a mile, to give a signal by blowing a long blast, contemplates a vessel continually moving and approaching the bend. "If the situation of a vessel lying still near a bend is such as to make a signal prudent, we can only say that congress has not provided for it by this rule."—TRANSFER No. 21, 248 *Federal Reporter* 459. The court in the same case also said: "We know of no obligation upon the part of tows to go at any particular speed with reference to other vessels. If the conditions of business make it expedient to take tows so heavy that progress can be made only on favoring tides, there is no reason we know of to forbid it. * * * A different question would arise in case of a claim against a tug for damage sustained by her tow, or if damage were done by the tug and tow to other vessels in narrow waters or crowded harbors."

* * *

In the case of Higgins v. Anglo-Algerian Steamship Co., Ltd., 248 *Federal Reporter* 386, it appeared that dates in damaged condition were delivered to a vessel, which damaged condition was known to the carrier, which nevertheless gave a clean bill of lading reciting that the dates were apparently in good order and condition, the shipper agreeing to indemnify the carrier against loss by reason of the false recital. It was held that the carrier was estopped, as against holders of the bill of lading who became owners and holders in due course of trade, to deny that it received the shipment in good order. It was also decided that such holder of the bill of lading was in contractual relations with the carrier, and entitled to enforce the contract contained in the bill of lading.

* * *

A boatswain who directed the operation of setting up deck lashings to secure a deckload of lumber, and under whose orders the sailors in the gang were working, was a seaman having command, and not a fellow servant, under the seaman's act of March 4, 1915. The ordinary rule which applies to assumption of risk by a workman is not applicable to the case of a seaman on board ship. "A seaman on board ship has not the privilege of using his own judgment or of quitting the ship's service if he apprehends danger, like an ordinary workman on shore. If owners can not be held as insurers of appliances furnished to the ship for the safety of seamen, they ought, at least, to be held to the strictest rule of diligence and care."—COLUSA, 248 *Federal Reporter* 21.

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On the Coasts, Lakes and Rivers

What's Doing and Who's Doing It

Threatened Strike on Lakes Averted

By M. L. Shaner

THE strike which was scheduled to take place on the lakes, starting July 29, has been amicably arranged. On July 28 a conference was held in the offices of the United States shipping board which resulted in the strike being called off. Those attending the conference were Chairman Hurley, Gov. Robert P. Bass, who is in charge of labor matters for the shipping board; Andrew Furuseth, president of the International Seamen's union; V. A. Olander, secretary of the Sailors' Union of the Great Lakes; Thomas Conway, secretary of the Marine Firemen, Oilers and Water Tenders' union; Patrick O'Brien, business agent of the Sailors' Union of the Great Lakes, and John W. Ellison, business agent of the Marine Firemen, Oilers and Water Tenders' union. At the close of the conference Chairman Hurley forwarded two telegrams to William Livingstone, president of the Lake Carriers' association, directing the association "to sign the nation's appeal for men to man its merchant ships as originally drafted and without any changes," and recommending that "during the negotiations before the United States shipping board concerning the grievances the Lake Carriers' association in shipping crews for its vessels should not require seamen to register in its shipping offices or assembly rooms." Telegrams were also sent by V. A. Olander calling off the strike. As these were received at all lake ports on the morning of the 29th, very little time was lost in getting boats out that were ready.

* * *

The tug COLUMBIA was sunk on the bank of the Black river, south of the Erie avenue viaduct, Lorain, O., late in the evening of July 28. She was towing the steamer E. J. BUFFINGTON, inbound, when she struck the vessel and sprung a leak. The COLUMBIA belongs to the Great Lakes Towing Co.

* * *

The steamer MINNESOTA, which was built at Wyandotte, Mich., in 1888, has been added to the Atlantic squadron of the merchant marine training ships of the United States shipping board recruiting service. She has been sent from New York to Boston, where she will be refitted. When this is completed she will be put into service at Norfolk, W. Va.

* * *

The steamer ANGELINE, while going into the Carnegie coal dock at Superior, Wis., came against the concrete corner of the dock and stove a hole in her about 20 feet long above the water line. She was unloaded and towed to the shipyards for repairs. She is one of a number of steamers which have been damaged while trying to get into this dock without a tug.

* * *

The steering gear of the steamer W. A. ROGERS became disabled on the night of July 29 and the vessel hit a dock at Sarnia, Ont. She damaged her rudder and quadrant and was taken to Lorain, O., by the tugs COLTON and MICHIGAN. It was expected that she would be laid up there for about a week for repairs.

* * *

During the week of July 18, eight steel ships with a total deadweight tonnage of 35,890 were delivered by American shipyards, according to announcement made by the United States shipping board. Launchings for the week included 10 steel vessels with a total tonnage of 53,250, and five wooden ships with a tonnage of 19,200. Of these seven were at Pacific coast yards and six at Lake yards. Shipyards on the Great Lakes led in deliveries with four vessels. These deliveries bring the total number of vessels built for the shipping board to nearly 250, with 1,500,000 deadweight tonnage.

* * *

According to an announcement made by Capt. William H. Reid, contracts have been let to the Foundation Co., Port Huron, Mich., for the construction of a sea-going tug for the Reid Wrecking & Towing Co. The tug will be 120 feet in length, 25 foot beam and 15 foot molded depth. She is to be ready for delivery Nov. 1, is to be modern in every respect and fitted for salt water service. The Foundation Co. recently took over the Reid dry dock and is expecting a contract from the government for 10 ocean tugs.

* * *

The American Shipbuilding Co. launched the steamer LAKE HEWES, building for the Emergency Fleet corporation, at its Cleveland yard on July 25. The new ship will be completed and ready for service about Sept. 1. The keel for another steamer for the Emergency Fleet corporation was laid on the berth in a few minutes after the LAKE HEWES struck the water.

* * *

C. B. McAdams, Washington, Pa., wireless operator on the steamer HARVEY H. BROWN, fell into the hold of the steamer at Erie, Thursday night, Aug. 1. He died at St. Vincent's hospital where he was taken after the accident.

* * *

The tug BOWMAN, towing the Reid Wrecking Co.'s scow ELEANOR, left Port Huron, Mich., on the morning of July 26 for Southampton, Ont., where the wreck of the steamer GOUDREAU is lying. The Reids intend to remove her boiler and machinery.

* * *

Charles Backus, for a number of years with the Great Lakes Towing Co. at the river office, is now with the R. A. & W. M. Williams Co. He will look after the chartering of grain tonnage.

* * *

A 3500-ton steel ship was launched at the Ecorse plant of the Great Lakes Engineering Works on July 26, just 14 days after the keel was laid. This almost halves the record made when the 5500-ton cargo carrier, the TUCKAHOE, was launched in 27 days. A large force of men at the Ecorse plan are rushing the work of equipping the ves-

Aid for Stranded Vessels

IN the absence of so much of the wrecking equipment from the Great Lakes the United States steamship ISLA DE LUZON *is ready any time to render assistance to stranded vessels. Commander William N. McMunn had thought that the availability of this ship was generally understood by masters, but he has informed President William Livingstone, of the Lake Carriers' association, that he recently discovered that masters do not generally understand that the vessel can be used for wrecking purposes. If vessel masters will wire the district commandant at Great Lakes, Ill., when in need of assistance, the district commandant's office will communicate with the* ISLA DE LUZON *by radio, and the steamer will immediately proceed to the scene of disaster for the purpose of rendering such assistance as it can. The* ISLA DE LUZON *draws 13 feet of water, is 200 feet long, 1030 gross tons and has twin screws. Her total horsepower is 2600 and she has a maximum cruising speed of about 12 miles an hour.*

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sel with engines so that she may be delivered in record time. Charles A. Braisley is superintendent of the plant, and both he and A. C. Pessano, chairman of the board of directors, received congratulatory telegrams from Charles M. Schwab.

* * *

The circuit court of appeals at Chicago handed down a decision recently in the case of the steamer EASTLAND. The claim of the Great Lakes Towing Co. was held to be a salvage claim and first lien on the proceeds of the sale of the steamer made by the trustee appointed by the United States court at Chicago. Payment of the claim with interest and court cost was ordered. The EASTLAND rolled over in Chicago harbor July 24, 1915, and 812 lives were lost. She was floated by the Great Lakes Towing Co.

* * *

Capt. Thomas Reed, representing the Canadian Steamship line, has purchased the steamship MAGGIE MARSHALL. She will be fitted out and be used by them at Halifax as a wrecking steamer.

* * *

The steamer AUSTRALIA which was sunk in the St. Clair river in a collision with the steamer B. F. JONES is being repaired at a Cleveland yard. It is estimated that the repairs will cost at least $75,000.

* * *

James Montgomerie, who acted as a surveyor for Lloyd's Register of Shipping at Cleveland in 1911 has had the university degree of doctor of science conferred upon him by the senate of London. The degree was conferred in recognition of the value of his thesis on the behavior of flat plates of shipbuilding quality when exposed to fluid pressure. Mr. Montgomerie is now chief surveyor at Glasgow.

Along the Atlantic and Gulf Coasts

HEAVY catches of cod and haddock are being brought to Boston. Among the notable hauls is that of the steam trawler WALRUS, 425,000 pounds. This vessel, recently commissioned, is commanded by Capt. Clayton Morrissey, formerly of the auxiliary schooner ARBUTUS with which he at one time outdistanced the Dominion cruiser FIONE whose captain believed the Yankee skipper had been fishing in barred waters.

* * *

Capt. W. H. Kenney, of the British schooner M. S. KENNEY, died at Boston recently, having been stricken while his vessel was bound to that port from Clark's Harbor, N. S.

* * *

The steamer C. A. CANFIELD rammed the Meridian street drawbridge, East Boston, badly damaging the structure. The ship's deck railing was torn away for a considerable distance.

* * *

A strike of coal trimmers seriously delayed shipping at Boston recently. The men demanded 75 cents an hour, an increase of 15 cents. The strike was settled following conferences between officials of coaling companies and representatives of the union.

* * *

The auxiliary schooner GEORGIA was sunk in collision with the steam collier BRISTOL near Nantucket during a fog. Captain Firth of the sailing vessel and his crew were rescued by Captain Hart of the BRISTOL, which stood by until the GEORGIA went to the bottom.

* * *

A new motor-propelled trawler, the PIONEER, built by James & Tarr, Essex, Mass., for F. C. Pearce, Gloucester, Mass., has been placed in commission. The PIONEER is 140 feet long with a capacity of 400,000 pounds of fish.

* * *

Service between Boston and Yarmouth, N. S., has been resumed with the British steamship ARANMORE, which was withdrawn by the admiralty and slated for other work. Protests of merchants and shippers, however, resulted in restoration of the vessel which will carry freight exclusively.

* * *

The British 3-mast schooner CONRAD S has been purchased by the Grenfell Missionary association and will be renamed GEORGE B. CLUETT. The CONRAD S was employed in the West Indian trade and is at Boston loading cargo for Labrador.

* * *

A falling traveling crane at the N. E. Coal & Coke Co., Everett, Mass., carried away a topmast of the schooner MARY E. LYNCH, which delayed the vessel's sailing for an eastern port with a cargo of coke.

* * *

The steamer ONONDAGA, owned by the Clyde line, went ashore near Watch Hill, R. I., recently. Part of her cargo, valued at $400,000, has been salved. The ONONDAGA had just left Boston for Charleston, S. C., and Jacksonville, Fla.

* * *

The Russian bark GRACE HAWAR, detained several months at Boston because of unsettled conditions in Russia, has been chartered to load case oil for Australia at $1.20 per case.

* * *

Capt. J. F. Rutledge, formerly of the 4-mast schooner ORLEANS, will command the 4-mast schooner EDNA MCKNIGHT, building by R. L. Bean, Camden, Me.

* * *

Savannah, Ga., is to be made a receiving station for the United States shipping board, according to an announcement made by James Thompson, assistant district chief of the sea service branch. It is expected that Savannah's shipping will be more than doubled when vessels from all parts of the country begin to arrive. One reason for the installation of the Savannah station is to relieve the shipping congestion at other Atlantic ports.

* * *

According to officials of the Foundation Co., Savannah, Ga., 40 more mine sweepers are to be built at that plant upon the completion of the present work, which includes 36. Quite a number of these are well under way.

* * *

The first of the barges built by the National Shipbuilding & Dry Dock Co., Savannah, Ga., have been towed to Charleston, S. C., where they will be put in working operation. The company is now building a barge a day. The barges are valued at $25,000 apiece and are equipped with engines and derricks.

* * *

The MEXOIL, first steel ship ever built in the south, launched some months ago by the Alabama & New Orleans Transportation Co., Violet, La., has begun service between the Mexican oil fields and New Orleans. The PANOIL, the second of the fleet of four being built for the Mexican Petroleum & Transport Co., has been launched and is being outfitted, while two more vessels of the same type will be sent into the water soon. Following the completion of this fleet, the transportation company has other private contracts to fill, and after these vessels are built it will construct steel barges for use on the river and the lakes near New Orleans.

* * *

The steamer GENERAL CORDILL, which struck a snag and sank in the Mississippi river near Belleview, La., in February, has been raised and repaired, and is operating between Vicksburg and Greenville, Miss., again. The CORDILL is owned by the Royal Route Co. Capt. George Prince supervised her overhauling and repairs.

* * *

Memphis reports that an attempt is being made to revive steamer traffic between that port and Cincinnati, and that a steamer will be placed in that service in the near future. Twenty-five years ago the White Collar Line operated three boats a week leaving each port, but there has been no regular boat in this business for a number of years.

* * *

A tanker arrived at an Atlantic port recently after a five-hour fight with a German submarine 600 miles off the New Jersey coast. The ship's cook was wounded in one leg by shrapnel during the engagement. The U-boat, sighted when eight miles away, tried to head off the tanker from the land and then opened fire, discharging about 200 shots. The tanker replied with 40 shots from her 4-inch guns, as she raced away, sending out S. O. S. calls by wireless. The submarine was finally outdistanced.

* * *

Wireless reports received at a Pacific port recently said all the passengers of the Japanese liner CANADA MARU, which when ashore on reefs dur-

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ing a dense fog have been safely taken off. The steamship, of 5760 tons gross, struck with considerable force and water poured into two of her holds. The CANADA MARU'S cargo is a silk shipment valued at $2,000,000.

* * *

The state engineer and surveyor of the state canal board, New York, has approved plans for repairing a bulkhead on the east river in New York harbor, and the construction of a freight house at the Rogers street, Long Island City, barge canal terminal, north of the Queensboro bridge.

* * *

A submarine, said by its builders to be the largest ever launched in this country and embodying all the latest designs in submarines, went down the ways at the Fore River plant of the Bethlehem Shipbuilding Corp. recently. She was christened AA-1.

* * *

An explosion and fire destroyed the Spanish steamship SERANTES, of 3000 gross tons, in New York harbor, recently, causing a loss of approximately $3,000,000. The vessel, loaded with oil, was under lease to the Standard Oil Co. She was scheduled to sail for Spain.

Several men who lost their lives were reported to have been trapped in the hold. Members of the crew who escaped said the decks became so hot they were forced to jump into the water. Before a coast guard cutter, hastening to the rescue, arrived, there was a tremendous explosion in the SERANTES and most of superstructure was torn away. Thirty-one members of the crew were picked up.

* * *

Harry G. Lytle, cashier of the Robins Drydock & Repair Co., Brooklyn, N. Y., died in that city July 22, from injuries suffered in an automobile accident on June 2. Mr. Lytle was widely known in the shipbuilding business and had been with the Robins Co. for 30 years. He also was treasurer of the William H. Todd Corp.

Up and Down the Pacific Coast

FOLLOWING the visit to north Pacific ports of Charles M. Schwab, director general; Charles Piez, vice president, and John H. Rosseter, director of operations of the Emergency Fleet corporation; W. G. McAdoo, director general of railroads, and John D. Ryan, director of aircraft production, there is increased enthusiasm among shipyard workers of the Pacific Northwest to speed up production. Mr. Schwab left a trail of optimism behind him and forged a spirit of unanimity and co-operation among the workers that was never before apparent. He promised north Pacific yards contracts for as long a period as the government requires ships. Mr. Rosseter's mission was to prepare for the future and he predicts great shipping activity on the Pacific following the war.

* * *

Further labor troubles are in prospect in the British Columbia shipyards where the metal trades have decided to demand a basic scale of $7.20 for all affiliated trades. The council is on record as not being bound by the Robert's scale which became effective June 1 and which provides for a basic scale of $5, the adjustment of disputes by an official arbitrator; also for a revision of wages every three months. Operators on the British side are hopeful of governmental intervention.

* * *

J. F. Duthie, president of J. F. Duthie & Co., and David Rodgers, superintendent of the Skinner & Eddy plants, together with George A. Armes, president of the Moore Shipbuilding & Dry Dock Co., San Francisco, recently went to Philadelphia to meet Emergency Fleet officials with reference to a new scale of wages for the yards in the Seattle district. This committee was appointed by Vice President Piez for the purpose of arriving at some concrete understanding in the matter of the wage scale.

* * *

The first commercial order for Anchorage district, Alaska, coal from any place outside of a community on the Alaska railroad, was recently placed. The shipment will be sent from Susitna, Alaska, via Anchorage, to Juneau, Alaska, and will amount to 150 tons. The water freight rate from Anchorage to Juneau is $3.75 per ton. Heretofore, all Alaskan communities have purchased coal at Puget Sound or British Columbia mines but the commercial possibilities of the coal fields in Alaska are expected to relieve the demand at the mines close to Puget Sound.

* * *

Reports from Alaska indicate that there will be at least an average and possibly better than an average pack of salmon this season. The new pack has already begun to arrive in Seattle. The government has first call on about 60 per cent of the Alaska pack and there will be a splendid market for the balance. The steamship companies are anticipating a heavy movement of southbound freight from Alaska during the next four months and additional steamers are being placed on the northern routes.

* * *

An opinion rendered by the board of Canada grain commissioners is to the effect that wheat, even carrying a high percentage of moisture, can be successfully transported between Vancouver, B. C., and Europe via the Panama canal in bulk without suffering injury. This opinion has been reached after several experimental shipments were forwarded and means much to British Columbia which will probably have a surplus of foodstuffs for the home country.

* * *

Late figures covering the fleets of the leading Japanese steamship companies operating in the Pacific show the following: Operating between Puget Sound and Hongkong, the Nippon Yusen Kaisha has six steamships of 55,482 tons; between Oriental ports and New York, via Panama canal, the same company has four vessels of 28,054 tons. The Osaka Shosen Kaisha has six large steamships of 46,749 tons operating between Hongkong, Singapore and Puget Sound. The Toyo Kisen Kaisha operates four vessels of 50,020 tons between Hongkong and San Francisco.

* * *

For service in the Oriental trade, the Pacific Steamship Co. has purchased the auxiliary wooden schooners ADMIRAL SIMS and ADMIRAL MAYO, built at Seattle by the Puget Sound Bridge & Dredging Co. The former vessel has already been delivered and has sailed for Singapore. These ships are of 3200 tons each, and in the absence of large steel vessels are expected to prove eminently satisfactory in plying between Seattle, Hongkong and Singapore. The Pacific Steamship Co. has built up a large business during the year it has operated in the Straits Settlements trades. This business was handicapped by the loss of the steamship UMATILLA, off the Japanese coast, and it was necessary to obtain additional tonnage.

* * *

Eighteen apprentices, recruited by the sea service bureau of the Emergency Fleet, have returned from a cruise to Bering Sea in the fisheries steamer ROOSEVELT. The tour required two months and was filled with thrills. For weeks the ROOSEVELT fought with ice floes and during that time she succeeded in saving a number of cannery ships which were threatened with destruction in the ice. The apprentices are enthusiastic over their experiences.

* * *

Because the steamship lines operating to Alaska have raised the rates for carrying the mails to the North, the postoffice department has decided to discontinue the regular mail service and to ship the mails by express and freight. The local companies justify the increased rates because of the higher costs of operation and have entered a formal protest against the action of the department.

* * *

After many years of faithful service, the little steamer DORA is to be withdrawn from the mail and passenger route from Seward to Unalaska, Dutch Harbor and Bristol bay ports, all in Alaska. This has been for years the most northerly all-the-year steamship route in the world. Changing conditions, increased costs and other factors have made the route unprofitable and the Alaska Steamship Co. has decided to bring the DORA to Seattle to remain idle. The DORA has had many thrilling experiences, the most notable of which was her reappearance after an absence of 46 days, during which she drifted helplessly from Seward to Honolulu, returning finally under sail.

* * *

The British government has commandeered the 8800-ton steel steamer ALASKA, launched at Vancouver, B. C., recently, for Knut Knutson, of Norway.

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Equipment Used Afloat and Ashore

Small Geared Turbines—Portable Hole Cutter—Scarf Milling Machine—Rotary Air Planers—Moisture Proof Switch Covers

TO meet the demand, which comes from the new merchant marine for lighting sets, the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has developed a line which is being manufactured in sizes from 15 to 50 kilowatts for direct-current service, from 30 to 50 kilowatts for alternating-current service and from 30 to 100-horsepower for mechanical drive.

This machine is a compact geared unit, of rugged construction. The turbine operates at a speed of 7200 revolutions per minute and it is suitable for both condensing and noncondensing operation. It is built for normal operation on any steam pressure from 75 to 250 pounds and for noncondensing operation on any back pressure up to 20 pounds. It embodies the 3-point suspension principle, being supported by two lugs on the generator and one under the center of the turbine. This feature maintains alignment of the turbine, gear and generator.

The generator is of the compound wound type with commutating poles. This design, it is said, insures sparkless commutation, even at heavy overloads, without shifting the brushes. It is pointed out that this is an important advantage because no attention is required to adjust for changing loads. The coils are impregnated by the vacuum process, making them proof against dampness. The outboard generator bearing is supported by a single-piece bracket bolted to the frame. In this bracket a steel shell lined with babbitt forms the bearing itself which is pressed and doweled in place. In case of trouble it can readily be renewed. Oiling is accomplished by the ring system.

The internal construction consists of a single rotating wheel with buckets around its periphery. Steam from the directing vanes or nozzles impinges against these blades which causes the wheel to rotate. The full energy of the steam is extracted by using only one wheel with the aid of what is commonly known as the re-entry principle, that is, the steam after passing through the blades the first time, is changed in direction by means of a reversing chamber and is directed against the blades a second time. The nozzle and reversing chamber are made of phosphor bronze designed to resist the erosive action of steam at high velocities. In the 15 and 25-kilowatt units, the nozzle block contains but one nozzle, while in units from 25 to 50-kilowatt capacity, the block contains two nozzles, one of which is controlled by a hand operated valve. At partial loads this valve may be closed and thus the water rates are greatly decreased, and a much higher efficiency is obtained.

Bearings Are Adjustable

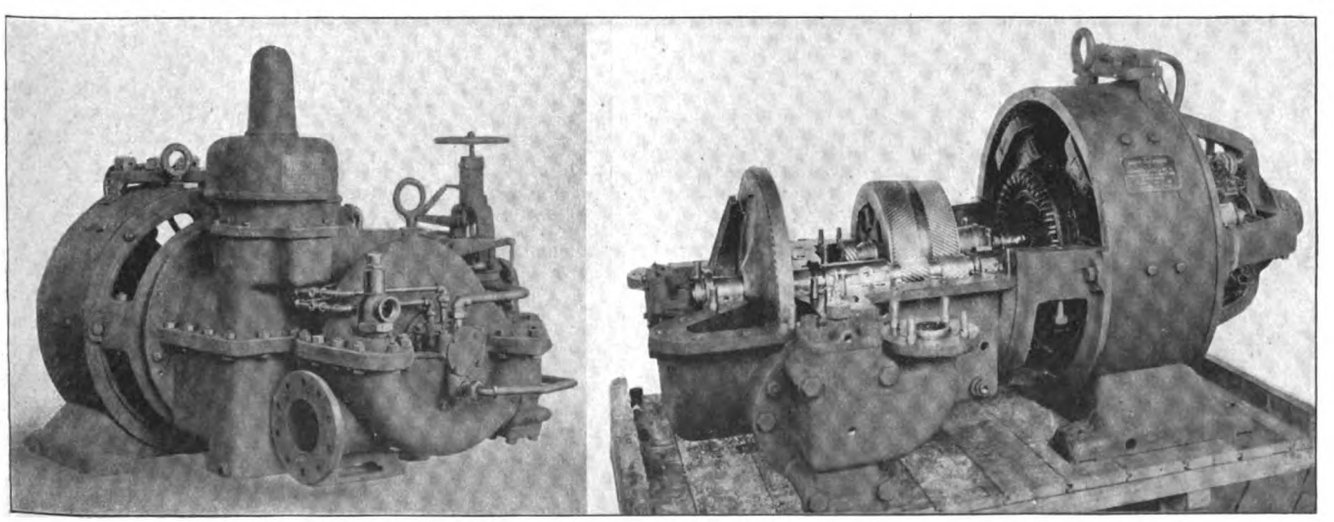
The bearings on the turbine end are cast iron, lined with babbitt. Those on the rotor and pinion shaft are adjustable which makes it possible to keep the alignment between the pinion and gear. The outboard generator bearing is a steel shell, lined with babbitt, pressed into the housing and doweled in place. It is ring-oiled. The pinion is milled out of the solid rotor shaft.

These machines are fitted with brass, water-sealed glands, shrunk on the shaft. The glands seal the turbine casing around the shaft and prevent steam from escaping when operating noncondensing. Also they prevent air from entering when operating condensing.

The governor on this unit is a low-speed, vertical fly-ball type. The slow speed is obtained by driving the governor with a pinion on the slow-speed gear shaft. The fly balls are pivoted on knife edges and they are said to be sensitive even to slight speed variations.

At the base of the governor, and driven by the governor spindle, is a pump which supplies oil for both turbine and gear. The bottom of the gear housing is used as an oil reservoir. The pump lifts the oil from the reservoir to the top of the gear case from where it flows by gravity through the oil strainer and to the bearings and other parts needing lubrication. The oil is kept cool by a coil in the bottom of the oil reservoir.

One of the latest improvements on this turbine is the overspeed governor release. This is a simple device contained in a small hole drilled in the shaft between the pinion and rotor. It consists of a cylindrical weight held in place by a coil spring. In case the turbine should speed up to 10 per cent above normal speed, the weight, due to centrifugal force, overcomes the spring tension and protrudes a short distance from its normal position. By so doing, it comes in contact with a



THE VIEW AT THE LEFT SHOWS THE ASSEMBLED TURBINE. IN THE VIEW AT THE RIGHT THE UPPER HALF OF THE CASING IS REMOVED TO SHOW THE ROTOR AND THE REDUCTION GEARING

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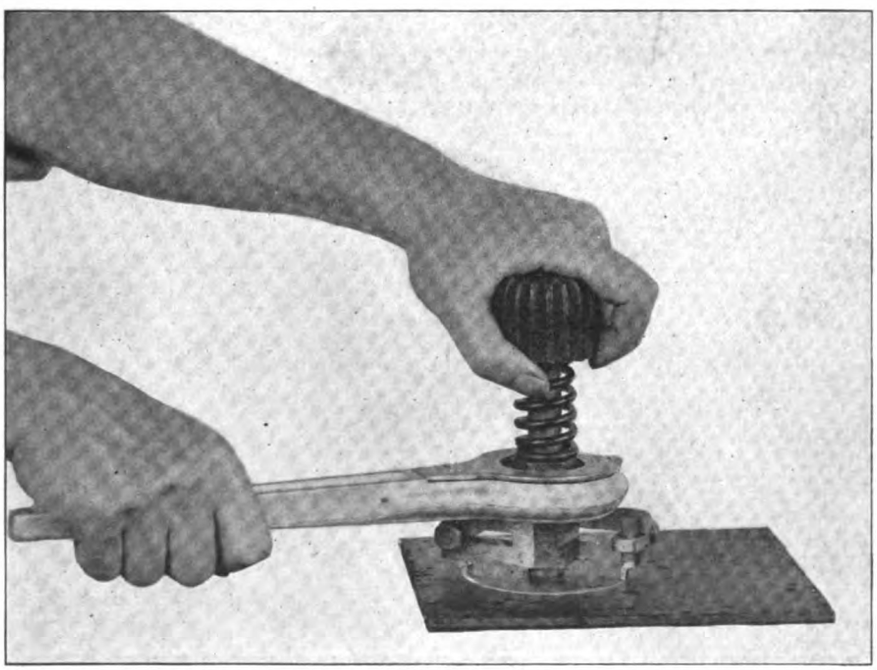
lug, which, in turn, is fastened to a lever, the movement of which trips the throttle valve catch and allows the valve to be closed by a heavy coil spring.

Portable Hole Cutter

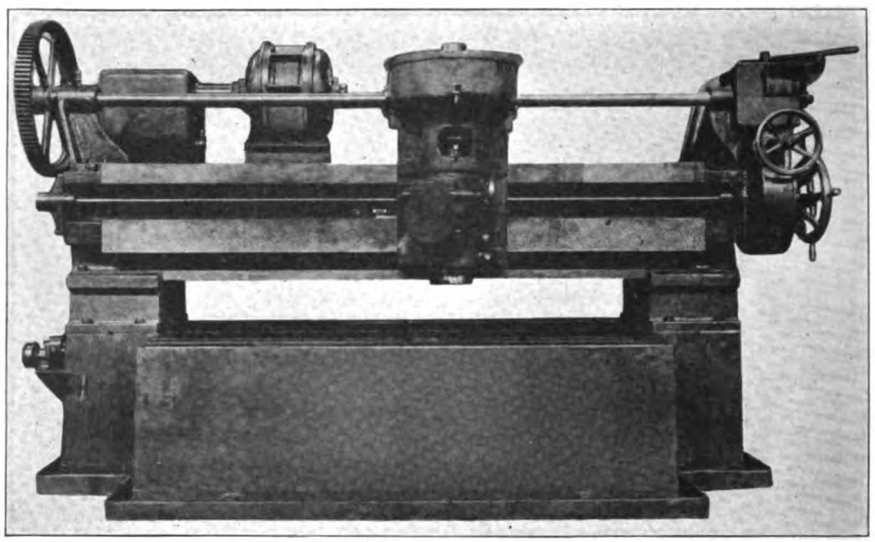
To facilitate cutting holes in plates, tanks and irregular shaped castings and for work in confined situations where it is not practicable to use an oxy-acetylene cutting outfit Koch & Sandidge, Chicago, have developed the adjustable cutter shown in the accompanying illustration. It is said this tool is specially adapted for use in general fitting out and ship repair work.

The tool consists of a cast-steel swing chuck, equipped with two adjustable blades. Pressure is applied to the work through the medium of a stiff spring which is adjusted by means of a corrugated hand nut. The blades are rotated by a handle which is equipped with a ratchet attachment. This feature, it is pointed out, materially aids in using the tool in confined places. When equipped with standard blades the device will cut holes through 3-16-inch steel; for heavy material up to ½-inch, special blades are provided.

In using the device, a ⅜-inch pilot hole is drilled first. In the case of thin material a nut is screwed on the pilot on the opposite side of the sheet to be cut. With heavy material the pilot hole is tapped and the pilot screwed directly to the work. This eliminates the use of a nut where it might be difficult to place in position; on the inside of a tank for instance. Another use for the tool is found in making special size washers which are generally costly to produce by other methods, or hard to pick up from stock. In making washers, one blade is set to cut the hole while the other cuts the periphery.



HAND OPERATED CUTTER HEAD FOR CUTTING HOLES IN SHEETS AND PLATES



MACHINE FOR MILLING DECK PLATE SCARFS

Scarf Milling Machine

The machine shown in the accompanying illustration was recently designed by the Newton Machine Tool Works, Inc., Philadelphia, for the purpose of milling scarfs on ship deck plates. The machine is of massive construction throughout and is designed to insure maximum production.

The top surface of the base forms the work table or platen of the machine. The space between the uprights is 9 feet 2 inches x 4 feet 9 inches. Parallel T slots for the accommodation of clamping bolts run the entire length of the table. Also a number of reamed holes are provided for locating stops to take the side thrust of the cut. Aligning slots run at right angles with the T slots. This feature permits the location of the work in a convenient position. An oil pan is cast integral with the base and is equipped with a supply pump for lubricant.

The crossrail is of the self-contained type. The spindle is 5 inches in diameter and has a vertical hand adjustment of 10 inches. The maximum distance from the top of the platen to the spindle nose is 10 inches and the length of feed available for the head traveling along the cross rail is 9 feet.

The spindle is driven through the medium of a worm and worm wheel. The worm wheel is equipped with a bronze ring on which the teeth are cut. These are of steep lead. The driving worm is hardened to insure it against reasonable wear and is equipped with roller thrust bearings. The worm and worm wheel are oiled by means of continuous lubrication.

The machine is driven by a 25-horsepower motor mounted on the rear of the upright. Power is transmitted to the spindle through the medium of spur gearing. A speed box is provided which gives six changes of speed. The speed box gearing is mounted on sliding sleeves which are actuated by latch levers.

The motion for the feed is taken from the right hand side of the crossrail and is available in both directions by means of a clutched double train of bevel gears.

As the bevels on ship deck plates vary as regards the angle, it is neces-

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sary to provide means for milling different angles. This is accomplished in this case by providing separate sets of uprights which are shown mounted between the crossrail and the base. Each pair of uprights is made of a suitable angle to accommodate a certain angle of scarf. The uprights are provided with aligning slots and keys to insure proper location when changes from one set of uprights to another are made.

Air Operated Hand Planers

A novel tool called an air planer has been developed by the Shipbuilders' Pneumatic Tool Co., Portland, Oreg., for use in wooden shipyards. The device consists of a substantial base in which is fitted a revolving cutter head, this head obtaining its rotary motion from an air turbine. The planers are made in three models, of which one is employed for smoothing the sides of vessels, another for surfacing large timbers that are often too cumbersome to handle on an ordinary wood planer, and a third for cutting grooves in ships' frames to accommodate steel strapping.

It is claimed that one man can surface 385 square feet of a vessel's side in five hours, leaving a uniform smooth surface over treenails, knots, caulking, marine glue and pitch pockets. This operation is shown at the left in the accompanying illustration. The air supply is controlled by a handle and the maximum depth of cut is 1-32 inch. This model weighs 10 pounds.

The type used for surfacing large timbers is shown at the right. Here the operator has bevel-cut the edge of the timber to a mark and has set the machine for a deep cut with the object of effecting the operation formerly accomplished with an adze. This completed, the planer is set for a light cut to finish the timber.

This machine is operated by a double turbine horizontally mounted on an adjustable carriage. It weighs 21 pounds.

The unit employed for cutting grooves in frames is a modification of the machine just described but with a different knife adjustment.

MOISTURE PROOF SWITCH COVERS FOR MARINE INSTALLATIONS

Cover for Push Switches

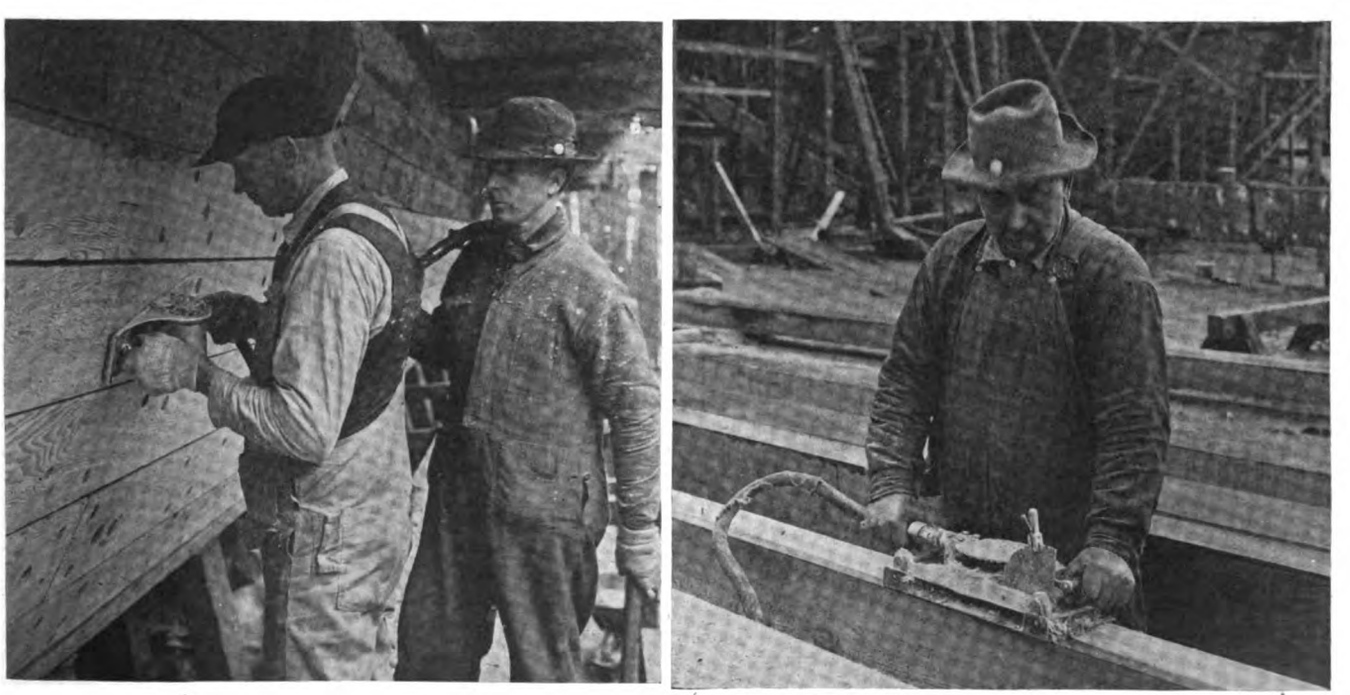
Because of their ease of operation, double push-button switches are often used in marine installations. Their use has been restricted in some cases, however, owing to the fact that they are not sealed against the admission of steam and moisture, which is harmful. The Crouse-Hinds Co., Syracuse, N. Y., has developed a cover for switches of this type which seals them against all forms of moisture. In the accompanying illustration, the upper view shows a two-gang cover installed on a conduit while the lower views show a single conduit and cover.

The mechanism which operates the push buttons is under the cover and is controlled by a shaft. At one end of the shaft is a flattened projection for operating the push buttons while the other, or outer end terminates in a handle. The handle is marked with on and off indicators which are convenient in cases where the source of light is in a separate compartment from the switch.

The part of the shaft which passes through the cover is provided with grooves that are packed with hard grease. The grease serves to keep the shaft bearing moisture-proof, while a rubber gasket seals the joint between the cover and the conduit.

Leases New Quarters

The Independent Pneumatic Tool Co. has leased the entire sixth floor in the Otis building, Chicago. This space contains 12,000 square feet and will be occupied by the company for its general offices. John D. Hurley, president of the company, stated that the great demand for pneumatic tools for government work and shipbuilding had forced the company to seek larger quarters. The space now occupied contains 6000 square feet while the new quarters provide just double this area.



AIR PLANERS DESIGNED FOR USE IN WOODEN SHIPYARDS

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Red Hot Tips From the Trade

Pertinent Suggestions and Personal Gossip

RAPID progress is being made by the new Gulowsen Grei Engine Co., Seattle, in preparing the site for the oil engine factory which it is to erect on Salmon bay at a cost of $350,000. Nearly $200,000 of that amount is represented by orders for tools. The factory will manufacture both marine and stationary oil engines. The company, which was incorporated recently, has established its offices in the Alaska building.

When the site is prepared, the company will begin work on the construction of a number of buildings, plans having been drawn up for the following: Office building, 45x80 feet; machine shop No. 1, 30x255 feet; machine shop No. 2, 60x100 feet; assembling shop, 44x255 feet; test room, 45x70 feet; foundry, 94x132 feet; pattern shop, 30x100 feet. The site consists of six acres fronting on Salmon bay. The new Seattle enterprise is the outgrowth of the Gulowsen Engine Co., Christiania, Norway, which has been manufacturing oil engines in that country since 1893, its plant being one of the largest of the kind in the Scandinavian kingdom. The Seattle concern was organized by Anders Gulowsen, founder of the Norwegian company, O. C. Rossoe and R. A. Rossoe.

Cable Lines

All America Cables, New York, has issued a booklet describing its cable systems which extend north and south from New York to Buenos Aires. It is said that the system is speedy and accurate and that messages are now being forwarded without retransmission by hand. With the booklet is included a folder describing censorship regulations.

Marine Equipment

"Of Interest to Engineers and You" is the title of a folder recently issued by the Ross Heater & Mfg. Co., Inc., Buffalo. The folder is illustrated and describes water heaters, surface condensers and an expansion joint designed to compensate for expansion and contraction in pipe lines due to changes of temperature. Condensers made by the Ross company are made of close-grained cast iron so arranged with copper tubing, it is said, as to gain the maximum cooling surface. The heaters are designed for heating boiler feed water and for other similar purposes. Small copper tubes are used in their construction, through which the water makes several separate passes.

Seattle Has Tool Shop

The manufacture of high-grade steel tools is one of the newest industries established in Seattle as a result of the growth of shipbuilding. The Paragon Tool Co., of which John Graham is president; M. R. Helmer, vice president; M. E. Gulliford, secretary and treasurer, and A. F. Schlueter, superintendent, is making a specialty of shipyard tools. Practically all the tools used in steel ship construction, from rivet sets to shear blades, are manufactured.

Wire Rope

The George C. Moon Co., Garwood, N. J., has recently placed on the market a type of wire rope in which the wire strands are specially covered with tarred hemp marline. It is said that the marline covering prevents friction between the strands when the rope is in use, affords protection against moisture, keeps abrasive dust away from the wire and affords protection to the seaman's or workman's hands.

It is claimed that this rope is well adapted for marine use because it is flexible and can be handled and coiled easily, does not rust or swell when wet, is not affected by ice in winter and can be belayed at cleats and bitts with the ease of manilla rope. It is also said that for equal strength, this rope weighs but one-half as much as manilla rope and as it is only one-third of the diameter, it may be roved through smaller blocks.

Marine Auxiliaries

The McNab Co., Bridgeport, Conn., has just issued a catalog devoted to marine supplies. The catalog is well illustrated and describes ship telegraphs, steering wheels, mechanical turbometers, steam steering gears, helm signals, revolution counters, direction indicators, steam gages, whistles and whistle controls, marine telephones, chronometers, ship clocks, signal lamps, ship bells, binoculars and telescopes, ship logs, binnacles, marine engine indicators, torsion meters, ventilators, air ports, stockless anchors, stud-link chain cable and manila and wire rope.

Locates in Larger Quarters

The Great Lakes Engineering Works, Detroit, has moved its Cleveland offices from 970 to 420 Rockefeller building. The company's business has increased steadily during the past few years and this has made it necessary to provide more commodious quarters for the Cleveland office force.

Douglas Fir Spars

The Pacific Northwest Spar Co., Seattle, has issued an illustrated folder devoted to cargo and lashing booms, top and wireless masts, coaling booms and gin poles, jack and ensign staffs and signal yards for steel vessels.

Attention is drawn to the fact that Douglas fir, famous for its serviceability in withstanding the severe strains imposed on spars, is used almost exclusively by the company.

It is likewise emphasized in the pamphlet that the purchaser of Pacific spars can rely on them reaching him in a sound condition, for bags of sawdust are placed between them to insure their safe transportation.

Form New Department

The Dravo Contracting Co., Pittsburgh, announces that it will operate its Neville island plant as a separate department to be known as the Dravo Contracting Co., Engineering Works department. The company has been manufacturing tower whirlers, steel towboats and barges for some time and due to increased business has found it advisable to make this change. The company has contracts for 33 towboats and barges, the majority of which are for the government, as well as orders for tower whirlers from shipyards. An entirely separate purchasing department has been installed together with a new accounting and engineering organization. J. D. Berg has been made vice president of the reorganized company.

Walter J. Fitzgerald announces that he has entered the lake transportation and insurance business with office at 238 Wells building, Milwaukee.

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